DOCUMENT RESUME

ED 160 448 SE 025 088

TITLE	Youth Conservation Corps Source Book of Environmental Awareness: People and Natural Resources.
INSTITUTION	Department of the Interior, Washington, D.C.; Forest Service (DOA), Washington, D.C.
PUB DATE	77
NOTE	132p.; Contains occasional light and broken type
EDRS PRICE	MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS	*Conservation Education; *Environmental Education; Field Trips; *Leaders Guides; *Outdoor Education; *Science Education; Work Study Programs
IDENTIFIERS	*Youth Conservation Corps

ABSTRACT

This guide is written for Youth Conservation Corps (YCC) unit managers and staff. It provides philosophies, concepts, methods, and techniques for integrating environmental awareness in YCC camp programs. The first chapter of this sourcebook defines environmental education and gives six goals of environmental education that were a result of a workshop held in Belgrade, Yugoslavia in 1975. The next chapter discusses planning an environmental awareness program. It goes into planning projects, field trips, group living, and recreation. Emphasis is given to integrating environmental awareness into work projects. Chapter three presents activities to strengthen team work in the YCC program. It gives examples of solving a problem through group interaction, role-playing games, the process and problem solving approach to learning, and teaching process skills. The remaining chapters present ecological principles and environmental concepts, an environmental awareness scorecard for evaluating student progress, a discussion of urban youth and the YCC, and the roles of Federal and State agencies. (BB)

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YOUTH CONSERVATION CORPS SOURCE BOOK FOR ENVIRONMENTAL AWARENESS

PEOPLE AND NATURAL RESOURCES

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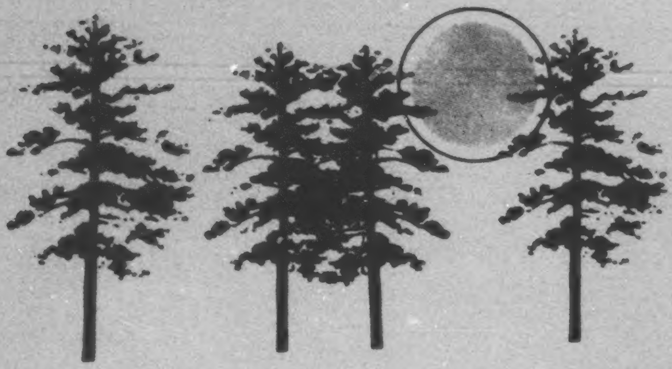

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U.S. Department of Agriculture Forest Service
U.S. Department of Interior

YOUTH CONSERVATION CORPS

SOURCE BOOK OF ENVIRONMENTAL AWARENESS

- PEOPLE AND NATURAL RESOURCES -

SUMMER 1977

CONTENTS

Introduction 1

Chapter 1 - Environmental Perspectives 3

Chapter 2 - Planning a Quality Environmental Awareness Program 8

Chapter 3 - Activities to Strengthen Team Work in the YCC Program 22

Chapter 4 - Ecological Principles and Environmental Concepts 40

Chapter 5 - Environmental Awareness Scorecard 53

Chapter 6 - Urban Youth and the Youth Conservation Corps 79

Chapter 7 - Roles of Selected Federal and State Agencies 95

Sourcelist 99

Selected Bibliography for YCC Environmental Library . . . 103

Glossary 108

Bibliography for Source Book 118

The Source Book is to be used as a guide in developing a quality environmental awareness (EA) program in balance with the whole YCC program, including projects, group living, interpersonal relations, and recreation.

It has been developed for use by:

Unit managers, such as District Rangers, Park Superintendents, etc., who evaluate projects for the YCC program in terms of environmental awareness and work that needs to be accomplished in managing the environment.

YCC staffs, including camp director, project coordinator, environmental awareness coordinator (EAC), crew leader, and counselors, so that they can plan and involve the YCCers in a totally integrated environmental awareness/work program.

As the summer of YCC starts and moves on, the YCCers themselves should become involved in the planning of the total program and may find this publication useful.

This publication combines the philosophies, concepts, methods, and techniques developed by the YCC camps administered in the last six years by the agencies and bureaus of the U.S. Department of the Interior, the U.S. Department of Agriculture - Forest Service, and the States.

A companion publication, YCC - Pocketbook for Environmental Awareness, designed for enrollees, should help you implement the YCC environmental awareness/work program.

Your contributions to and criticisms of this Source Book are greatly needed to help develop a quality environmental awareness/work program. They can be sent to either of the following addresses:

Director
Office of Manpower Training and Youth Activities
U.S. Department of the Interior
Washington, D.C. 20240

Director
Human Resource Programs
USDA - Forest Service
P.O. Box 2417
Washington, D.C. 20013

INTRODUCTION

The Source Book has been developed through joint Federal-State efforts for those individuals and groups responsible for planning and implementing the YCC programs. The material in this Source Book and its companion Pocketbook builds on the experience of the YCC program to date and follows the premise that each camp is and should be unique.

The YCC program direction established by law PL 91-378, as amended, is one basis for planning and development. The purpose of this Source Book is to establish guidelines for the development of each camp's environmental awareness/work program.

It is imperative to integrate environmental awareness into the total camp program. Environmental awareness will have more meaning and effect if it encompasses the entire YCC experience and is not restricted to a scheduled time period each day or week. To be more specific, the recreational programs, the camp layout and procedures, and work experiences, the meals, and the free time activities should all be considered to have great potential for achieving the environmental awareness goals and objectives. The integration of environmental awareness into the camp strengthens the program; helps to motivate those within the camp; increases decision making, teamwork, pride, and satisfaction in the work accomplishments; and increases knowledge about the environment and its management.

PROGRAM ELEMENTS

The environmental awareness/work program should be designed to allow the YCCers to learn about the "total environment." It should help young people acquire knowledge about relationships among various elements of the natural world and between man and that world. It should help them acquire at least an elementary understanding of the interrelated factors--scientific, technical, social, and cultural--which influence man's use of resources. Man can live in harmony with the land, provided he learns to choose wisely from among the often conflicting alternatives available to him in managing his environment. It is hoped that the work-learn experience in YCC will better prepare young people for this task and help them understand the importance of their own roles in the world's future.

The guidelines included here are written so that each camp, whether rural, urban, residential or nonresidential, can develop an awareness program which emphasizes that the development of a personal environmental ethic can begin with the Youth Conservation Corps experience.

The individual YCC program must be planned by those people directly involved in the camp and should reflect a realistic attempt to achieve the overall program goals.

Each camp staff, in developing a program, should recognize that environmental awareness begins with the local setting. It can then be broadened to relate to the total environment.

It is hoped that each camp, in developing its program, will utilize the most capable and creative resources available: the imaginations, attitudes, philosophies, and feelings of those within the camp.

The least meaningful or least productive approach would be to separate completely the work and the learning experiences. Increasingly, young people are asking for the reasons behind all types of activities, and this questioning attitude will no doubt be found in the young people who participate in the YCC program. For the majority, work projects will have to be meaningful and relevant, with the learning activities integrated. In all cases, much will be lost if the learning activities and the work projects are not integrated extensively. A number of approaches is available which can accomplish this integration (see Chapters 2 and 5).

CHAPTER 1 - ENVIRONMENTAL PERSPECTIVES

One of the most recent documents setting forth the goals and objectives of environmental education is the "Belgrade Charter." The Charter, titled the *Framework for Environmental Education*, resulted from the International Workshop in Environmental Education held in Belgrade, Yugoslavia, October 13-22, 1975, and sponsored by the United Nations Environmental Program (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). Over 65 countries were represented by the more than 100 participants who unanimously supported the Charter. In the *unedited* version of the Framework, the goal of EE is:

> To develop a world population which is aware of, and concerned about, the environment and its associated problems and which has the *knowledge*, *skills*, *attitudes*, *motivations* and *commitment* to work individually and collectively toward solutions to current problems, and the prevention of new ones.

To achieve the goal, the Workshop identified the following objectives:

1. *Awareness*:

   To help individual and social groups acquire strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.

2. *Knowledge*:

   To help individuals and social groups acquire a basic understanding of the total environment, its associated problems, and humanity's critically responsible presence and role in it.

3. *Attitudes*:

   To help individuals and social groups acquire social values and the ability to make sound choices while developing in them a sensitivity to the environment.[1]

This definition of environmental education is compatible with the YCC objective to develop an understanding and appreciation in participating youth of the Nation's environment and heritage. It gives a broad philosophy of environmental education within which YCC works.

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[1] *Research Camping and Environmental Education*. Compiled by Betty van der Smissen. Dean B. Bennett. 1975 Pennsylvania State College, HPER Series #11

To accomplish the purpose of the YCC law, we will stress three equally important objectives:

(1) Accomplish needed conservation work on public lands.

(2) Provide gainful employment for 15 through 18 year old males and females from all social, economic, ethnic and racial classifications.

(3) Develop an understanding and appreciation in participating youths of the nation's environment and heritage.

These objectives will be accomplished in a manner that will provide youth with an opportunity to acquire increased self-dignity and self-discipline, better work with and relate with peers and supervisors, and build lasting cultural bridges among youth from various social, ethnic, racial, and economic backgrounds.

We will seek the best way(s) to accomplish these objectives by directing or coordinating the program so that available resources--human, natural, and physical--are maximized and restraints are minimized.

In order to accomplish the purpose of the YCC law relative to developing an understanding and appreciation in participating youths of the nation's environment and heritage, the following goals and objectives were developed.

GOAL #1

To increase awareness of ecological principles that govern the environment.

OBJECTIVES

1.1 Identify the basic elements of the ecosystem within the area encompassed by the camp activities.

1.2 Describe the interrelationships among these basic elements (Objective 1.1), such as the food chain, energy cycle, and water cycle, etc.

1.3 Identify and describe the effects of work projects, recreational activities, and camp living on existing ecological interrelationships.

1.4 Discuss natural phenomena (fire, flood, earthquake, insects) and their effects on the environment.

1.5 Describe how people and current management practices affect and are affected by these natural phenomena (e.g., flood control, fire).

GOAL #2

To better understand man's social, economic, historical, cultural, and physical relationships with the environment.

OBJECTIVES

2.1 Assess the present conditions of the environment in terms of existing and potential problems.

2.2 Compare and contrast past and present economic, social and cultural demands, and their effect on the environmental management decisions.

2.3 Analyze those past and present environmental factors (Objective 2.2) and predict future trends and conditions (e.g., population, natural resources, basic needs, technology).

2.4 Identify the demands being placed on renewable and non-renewable resources in camp in the participants' home environment.

2.5 Describe and assess man's (people's) reasons for manipulating the environment.

GOAL #3

To increase awareness of the wide range of attitudes and personal values relating to the environment.

OBJECTIVES

3.1 Identify and define the policies and attitudes of some of the environmental groups, sportsmen's groups, equestrian groups, bicycling groups, etc.

3.2 Identify participants' feelings and concerns about their effect on the environment, in camp, in their home.

3.3 Recognize individual differences of opinions, values, backgrounds and goals involved in the camp programming effort.

GOAL #4

To assist each participant in recognizing the effect a personal environmental ethic has on the environment.

OBJECTIVES

4.1 Identify basic human needs for survival, and discuss the degree to which each participant's lifestyle exceeds these needs.

4.2 Identify factors that affect the quality of the camp environment.

4.3 Describe and discuss the participant's effect on the camp environment.

4.4 Analyze the effect that each participant's consumptive habits have on specific resources.

4.5 Discuss ways of changing consumptive habits to make better use of resources, in camp, in home environment.

GOAL #5

To experience problem solving and decision making processes which are applied to environmental management concerns.

OBJECTIVES

5.1 Describe and analyze the facts and the diverse opinions on a current environmental issue.

5.2 Use small group problem solving methods to reach a concensus on a current environmental issue.

5.3 Involve all camp members in the refinement of camp programming using small group problem solving methods (e.g. priorities of work projects, scheduling of recreational activities etc.)

GOAL #6

To increase understanding of the overall benefit of the YCC work program to the environment.

OBJECTIVES

6.1 Describe the basic differences and similarities of each land management agency involved in YCC.

6.2 Discuss the planning and decision making steps the agency used in arriving at the management decisions for the area of the work projects, and how the outcome may have differed from other land-use agency management plans.

6.3 Use small-group problem solving methods to plan and carry out the work projects so as to consider environmental impacts on the area, state, region, and nation.

6.4 Analyze the reasons for, and the benefits of, each work project by:

1. identifying the contribution that each work project makes to the overall management of the area, state, region, and nation.
2. discussing the benefits that the work project makes to society.
3. describing how the work project helps the agency accomplish its overall management objectives.

YCC as an Environmental Awareness Laboratory

With objectives such as these, the YCC could become a major influence on the ecosystems of the United States. The YCC could produce a nucleus of youth with the concern, motivation, and know-how which will be required if the environment is to be preserved and enhanced.

Other benefits that could be gained from the YCC program are numerous. An environmental curriculum could be developed for use not only in the YCC program but also by thousands of high schools across the country which are currently in need of various techniques for teaching environmental studies. The YCC could also provide a place for the training of prospective teachers on an apprenticeship or internship basis, giving practical experience as a part of their professional training.

A Comprehensive Environmental Awareness Program

A premise here is that the program will have more significant and enduring effects if it pervades the entire YCC experience and is not restricted solely to a scheduled time period each day or week. To be more specific, the recreational programs, the camp layout and procedures, the work experiences, the meals, and the free-time activities should all be considered to have great potential for achieving environmental awareness objectives in both the cognitive and affective domains.

CHAPTER 2

PLANNING A QUALITY ENVIRONMENTAL AWARENESS PROGRAM

Good precamp and continuous planning throughout the summer session is important for an integrated environmental awareness program including projects, field trips, group living, interpersonal relations and recreation.

RECREATION

Environmental awareness can and should be extended to recreation. For example, campouts can be to areas with different biotic communities. Comparisons of differences and similarities both in resource management and ecological and environmental principles can be observed, inventoried, and discussed by the crew leaders and the YCCers at the campouts. Soil compaction, soil type, slope, and possible additional inventory for an environmental impact statement can be the basis for choosing the site for a ball field or continuing to use an already established site. Crafts can be from natural materials of the area. Choices of types of recreation like sailing or canoeing, versus motorboating, can be considered in light of environmental impacts, including noise, consumption of energy, etc.

CAMP LIVING

Camp living can be influenced by environmental awareness activities such as developing a compost pile, developing a concern for use of water, avoiding use of nonbiodegradable materials and disposable items such as styrofoam cups, having the camp plan and serve an eco-meal, and then relating all of these activities to their living situation back home in their communities.

FIELD TRIPS

Field trips can reinforce environmental awareness of resource management and ecological concepts. They can introduce, reinforce, or complement projects the YCCers are or will be working on. They can expand the awareness of the YCCers to the activities of different agencies and groups in the area.

The field trips should be timely, fitting into the sequence of the summer activities as much as possible. Not all YCCers need to go on all field trips. The sharing of such experiences at camp can be a valuable learning experience. The preplanning of the field trip by the camp staff is important. The behavioral objectives, as well as attitudes, feelings, and awareness expected to be accomplished by the trip should be identified and discussed by the staff and the trip hosts. Group sizes can make a world of difference. Dividing the group into small groups of 5 to 6 or 8 to 10, depending on the situation, will give the YCCers the opportunity to ask questions and discuss points of interest. Crew leaders, counselors, and environmental specialists should have several questions in mind to get a good discussion going, if things lag.

Good planning includes transportation, travel time, lunch, breaks, etc.

WORK PROJECTS

Since the largest percentage of time is spent on work projects, they should be chosen for their potential for environmental activities reinforcing ecological principles as well as their importance to resource management.

Some Approaches for Developing a Correlated Environmental Awareness/ Work Experience Program for Y.C.C.[1] should be helpful in developing an integrated environmental awareness/work program.

The YCC Awareness and Work Experience Program can and should complement each other.

For people to develop an understanding about the workings in our natural and manmade environment, they need to become involved in some meaningful educational experiences that utilize the processes of environmental inventory and problem solving. This is the basis for understanding concepts of environmental management.

In order to develop and implement certain plans of environmental management and work projects, enrollees need to develop the skills and appreciation of meaningful work accomplishment and the motivation to apply these skills. Therefore, the environmental awareness program and the work experience program must be developed together to best meet the needs of the YCC enrollees and the environment in which they are working.

An important motivation to work accomplishment is understanding:

1. Why certain projects are important to the management of the environment.

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[1] Developed by: Alice Cook, Forest Service, Region 10, Alaska; Jerry and Martha Neyland, Environmental Education Consultants, and YCC Directors; Charline McDonald, Environmental Education Consultant, Portland, OR; and Jim Unterwegner and Ernie McDonald, Forest Service, Region 6, Portland, OR.

2. How they fit into the environmental management plans.

3. What skills, tools, and supplies are needed to do the job.

4. What are some of the environmental alternatives.

If the environmental awareness and project plans are developed and correlated so that participants and employees can develop these understandings and establish their own work priorities, then the work accomplishment can be of much higher quality, than just shoving crews into a project.

Described below are two approaches that have been used in the development of a correlated environmental awareness/work experience program. If the following approaches are used, the YCC enrollees can grow in abilities of:

1. Decisionmaking
2. Team work
3. Having pride and satisfaction in work accomplishment
4. Looking at resource management as an important tool in our society.
5. Recognizing problems and impacts that man creates and their effect on the environment.
6. Recognizing cause and effect relationship in the environment.
7. Recognizing that land management agencies and organizations have a responsibility to manage our environment to meet the needs of people.

Approach I - Planning and Decisionmaking Model

This approach leaves much of the planning and decisionmaking of what projects to do, when to do them, and what information is needed up to the enrollees.

1. Project List Developed in Winter

Agency staff generates a list of projects that YCC enrollees can accomplish. Included should be:

a. Projects that can be started and finished within the summer, such as stream improvement, campground rehabilitation, and trail maintenance.

b. Projects that cannot be finished during the summer but relate to a much larger resource management project, such as watershed rehabilitation, planting deer browse, recreation use, and survey inventory.

The staff, in indentifying the list of projects, should also identify the aspects of resource management and ecological concepts each work project can accomplish. The resource management concepts can be identified from the land management plan. Some ecological and environmental concepts can be found in Chapter 4.

Assess the project list to see if it provides a well-balanced combination of concepts of ecology and resource management. Use the following sheets for planning and evaluating:

a. YCC Project Inventory and Feasibility Worksheet (See page 17).

b. Environmental Awareness/Work Experience Planning Chart (See page 18).

c. Individual Project Lesson Plan (See pages 19-21).

NOTE: A combination of short- and long-range projects provides the satisfaction of starting and completing a project as well as working on a larger project that can not be finished in one session but that still contributed to the management of the resource.

2. Enrollees' Orientation to the Education/Work Projects (During the 1st week)

   a. Agency and YCC staff show and discuss the unit land management plan during enrollee orientation to the education/work experience. Have projects located on a map and discuss how each project fits into the management of the area.

   b. Take all enrollees to visit each proposed project (as near as possible) and discuss what needs to be done and again how it fits into the program of work. Have a unit map there so that they can relate the location of the project to the rest of the unit's land uses and allocation.

   c. Now, have enrollees discuss the projects and let THEM determine in what priority they want to do the projects (e.g., Do we do the TSI project early in the season before it gets hot, or conduct the recreation use survey before or after people-use develops, etc.). Discuss and decide what information they need to plan and accomplish the work project such as doing stream inventory prior to locating stream channel work.

NOTE: It is important to let them decide on priorities, safety precautions and training, tools and supplies needed, etc. The staff may have to discuss and point out factors that might affect their decisions, such as available transportation, mosquitos, fire danger, weather, supplies and materials, etc. Also, the agencies priorities should be considered.

3. Doing the Work Projects

Once a priority list of projects has been established and crews selected on the basis of ability, resource interest, etc., it is important to develop the on-the-ground criteria needed to layout and do the project.

a. If it's doing a tree thinning project, it might be using an increment borer to test the growth in a realigned stand to see what the work project will accomplish.

b. If it's constructing a fence around a water hole, it might be finding out how far a cow can reach for water and how strong the fence should be.

c. If it's erosion ditching, it might be testing the soil to see how it holds water or what its slippage factor is.

Whatever the project is, the quality and quantity of the work accomplishment can improve if the crews find out the how and whys of the work they are doing.

4. Crew Evaluation After Each Project (example of correlation between projects and environmental awareness)

After each work project or job is finished, have a crew and staff discuss such things as:

a. Cause and effect of accomplished project to the resource and the people using it.

b. Difficulties in doing the project; for example, if they built a trail across steep ground, swamp and flat ground--were they able to adapt to the different work situations? It is not easy to manage resources--you must stay flexible.

c. How did the crew work as a team? What could we do to improve?

Approach II - Land Use Simulation Technique

This approach starts out by using a land use simulation game to develop an understanding of the complexities of planning for and managing a piece of land.

Step I - Play the land use simulation game, "Centerplace City" (see lesson plan for a simulation game in the Pocketbook, page 19).

Step II - Now using parts of Approach I, have enrollees use the unit management plan as a real simulation game and correlate the work projects to actual land management decisions and land use allocations.

Constant Evaluation - Discuss these planning concepts with the enrollees as they are actually doing the projects. Do field investigations from the Pocketbook as needed to give enrollees additional skills in environmental inventories.

Miscellaneous

By now you can see that each plan is a variation of the other. The important thing is that the environmental education experience is related to and builds upon the importance and accomplishment of the work experience.

Field Trips: The use of field trips to view or study another environment can be an invaluable experience. After inventorying and investigating the environment in which they are working, the trainees could visit an entirely different place, which can provide an opportunity to view different management techniques and different ecological, economic and social influences and patterns. Environmental investigations from the Pocketbook can be conducted and comparisons about the data collected can be made.

Examples of comparisons of environmental field trips are:

Forest to sawmill
Forest to desert
Rangeland to wetland
Alpine to coastal shore
Urban to rural
Lake and pond vegetation at different elevations
Stream to a city using this water
Campgrounds to sewage treatment plant treating this water
Campgrounds to dump or landfill.

EXAMPLES OF CORRELATION BETWEEN WORK PROJECTS AND ENVIRONMENTAL AWARENESS OBJECTIVES

EXAMPLES OF PROJECTS	WHAT IT CAN TEACH ABOUT RESOURCE MANAGEMENT	EXAMPLES OF SPECIFIC EA OBJECTIVE FOR YCC EA WORK GOALS
Recreation		
Campground cleanup	Clean up behind people	1.3, 2.4, 3.2
Campground construction	Need facilities to protect resources	1.3, 2.5, 3.2, 6.2
Campground maintenance	Need for keeping facilities useable	2.1, 2.4, 4.5
Site planning	Evaluate recreation sites and potential use criteria need for solitude-recreation	1.1, 1.5, 2.3, 3.1, 4.4
Wilderness management	Clean up behind people	1.3, 2.4, 3.2
Trail construction or maintenance	Keep trails open for access	1.1, 1.4, 3.1
Sign painting & maintenance	Need for directional signs	2.2, 2.5, 6.
Stream		
Stream channel survey	Inventory to plan for water and wildlife	1.1, 1.2, 1.3, 2.2, 6.2
Gabion const. (pool)	Bank stabilization--increase pool--riffle ratio for fish	1.4, 2.5, 3.1
Trash removal	Prevent streambank washing	1.4, 1.5
Bank stabilization	Prevent soil erosion--protect roads	1.4, 1.5, 6.4
Timber		
Thinning	How a tree grows--increase tree growth (wood fiber)	1.1, 1.4, 2.3, 4.4
Tree planting	Start new forests	2.1, 2.5, 4.1
Timber sanitation projects	Keep potential insect & disease attacks down--increase quality of lumber	1.4, 2.5, 4.

Pruning trees Save snags for wildlife	Need for animal habitats	1.1, 2.3, 6.2
Insect & disease control	Need to maintain productivity of timber lands	1.4, 2.5, 6.2
Timber sale layout	Need for logical way to manage timber for substantial yield	5.1, 6.1, 6.3
Forage		
Fish water holes	Livestock need water	2.5, 6.1, 6.2
Maintain fences	Management method to prevent over grazing	2.5, 6.1, 6.2
Forage survey	Determine carrying capacity of land	1.1, 2.3, 6.4
Wildlife		
Plant bitterbrush	Increase carrying capacity	1.1, 2.5, 4.1
Browsing survey	Inventory amount of food	1.1, 1.4, 2.5
Build deer exclosure	Set up experiment	2.2, 2.5, 6.4
Build guzzler	Provide water for small game	1.1, 3.1, 5.1
Inventory habitats	Examine carrying capacity	1.1, 2.3, 4.1
Soils		
Contain ditching	Water storage to prevent run off	1.4, 1.5, 6.3
Bank stabilizers (mulching)	Prevent soil erosion	1.4, 1.5, 6.3
Soil mapping	Determine best uses of land--Determining soil characteristics	2.1, 2.2, 2.3 4.1
Fire		
Fire line building	Protection of resources for fire	1.4, 1.5, 3.1 6.1

Lookout and guard	Fire detection and suppression	1.4, 1.5, 2.5 6.1, 6.2
Station Maintenance		
Fire weather and dangers	Evaluation of factors affecting fire danger	1.1, 1.5, 2.3
Other		
Land line surveying		6.1, 6.2, 6.4
Land use management planning sessions	See resource plans in existence --Relate YCC projects to land management plan--Explore land use conflicts and pressures--Develop land use management objectives and guidelines at their level of understanding--Develop decisionmaking skills Develop communication skills	2.2, 2.5, 3.1, 4.4, 5.1, 6.2
Analyzing selected projects	Evaluating the impact of projects on the physical, social economic, and cultural resources	2.3, 3.2, 4.2 5.3, 6.3
Writing Environmental Impact Statements		1.1, 2.2, 2.3 6.3, 6.4
YCC recreation, social and work programs		3.2, 3.3, 4.2, 4.3, 4.4, 4.5

PROJECT INVENTORY AND FEASIBILITY WORK SHEET

Project	How it Fits into Management for the Unit	Short/Long Range--How Much Can Be Finished This Season	Information Needed to Plan and Accomplsih Project (Check if special consideration, such as transportation, weather, fire, safety precautions, training needs, tools and supplies)	Benefit to Learning Experience About Management	Benefit to Work Experience--Skills it Teaches	Benefit to a Group Interaction Experience, Leadership and/or Group Interaction

ENVIRONMENTAL AWARENESS/WORK EXPERIENCE CORRELATION PLANNING CHART

Work Project	What it Teaches About Management From Feasibility Work Chart	What it Can Teach About Ecology	Environmental Awareness Objectives it Helps Accomplish	Coordinated Environmental Investigations from the Pocketbook.	Other Reference Materials
Trail building	Intended use, soil condition, terrain and economics have a large impact on the construction techniques used to build trails	Basic elements, effects of natural phenomena (erosion) change	1.1, 1.4, 2.3, 3.1, 6.3, 6.4	Soil investigation (pages 2-18)	
Stream channel work-gabion installation	Inventory of stream need for pool-riffle ratio for fish, etc.	Adaptation, change	1.2, 1.3, 6.2 Food chain, carrying capacity, construct plan of management	Insect correlation to O_2, pH-water quality inventory (pages 46-66)	

Example #1 of an Individual Work Project Lesson Plan

Project: Trail Building

Objectives: At the end of this project, the participants will have:

1. Named at least five factors that effect erosion on a trail.
2. Identified the best way to build a trail using the above factors.
3. On a visit to the work project site, done #4, #5, and #6.
4. Demonstrated the use of a soil kit by taking soil samples in four places along the proposed trail.
5. Described the differences in the samples above and stated their reasons as to the differences noted.
6. Used this information to plan the path of the trail.
7. Constructed the trail in the work project area in the best manner, considering all input including environmental, managerial, and trail standards.
8. Described the reasons behind the trail building project and the contributions to the overall management of the resource.
9. Described the project's effect on economic, social, and ecological aspects.

A sequence of activities and discussions to accomplish the correlated EA/work experience objectives for this project:

A. Looking at the trail area: Discuss why there is a need to build a trail in this area. Have participants do an environmental inventory of what will be affected by the trail. Use the soil investigation from the Pocketbook (pages 2-18) in different areas along the trail. Discuss the implications of building a trail in these areas.

B. Visiting another trail area: On a visit to an old trail, discuss the effects of long-term use on a trail. Do soil analyses on eroded areas. Compare and contrast these findings with similar areas on the work project site.

C. Decide the best construction methods and location for the trail, on the basis of your observations and experiments.

D. Doing the work project: Do the actual work project.

E. Describing the benefits: After the project, have the group discuss why the project was important, how it fit into the overall resource management plan, and the project's effect on recreation, economic, social, and ecological aspects.

NOTE: The sequence of activities is designed to set the stage for the project by involving the crew in identifying, naming, and demonstrating a variety of procedures, methods, skills, and tools the resource manager uses in making field decisions, and then summarizing its part in resource management.

Such things as safety training, some tool selection, etc., have been left out because this sample deals only with the correlated EA work experience.

This project can help accomplish the specific environmental education objectives 1.1, 1.4, 2.3. 3.1, 6.3, 6.4.

Example #2 of an Individual Work Project Lesson Plan

Project: Stream Improvement (gabion construction for increasing the pool-riffle ratio)

Objectives: At the end of this project participants will have:

1. Named and identified in a stream at least six factors that affect the life in a stream habitat.
2. Demonstrated the ability to inventory a section of stream using an acceptable stream inventory and survey form.
3. Stated and applied a rule for establishing an adequate pool-riffle ratio for best fish habitat in a stream.
4. Identified the appropriate location and constructed gabions in a stream to accomplish #3 above.
5. Described how this project contributed to the management of the fishing resource in this stream and to the recreation, economic, social, and ecological aspects.

A sequence of activities and discussions to accomplish the correlated EA/work experience objectives for this project:

A. Inventorying the stream: Look over stream, then have group discuss what factors might affect life in a stream. Have them point out the factors in a stream. Discuss purpose and establish criteria for the location of more pools. Train group to use an existing stream inventory survey chart, or modify an existing one to meet your needs. Have crew inventory stream, identifying places where to construct pools to increase pool-riffle ratio.

B. Locating the pool sites: Have crew select and mark on-the-ground the final pool locations depending on the percent of pool-riffle ratio, best site locations, time allotments, materials available, etc.

C. Constructing the gabions: Complete the work projets.

D. Describing the benefits: After the project, have the group discuss why the project was important, how it fit into the overall resource management plan, and the project's effect on economic, recreation, social, and ecological aspects.

Relate discussion and learnings back to environmental awareness concepts identified in the correlation Planning Chart.

This project can help accomplish the environmental awareness objectives 1.5, 2.2, 2.5, 3.1, 4.4, 6.2, 6.3.

CHAPTER 3 - ACTIVITIES TO STRENGTHEN TEAM WORK IN THE YCC PROGRAM

The objectives of the program, as stated in the law, will be accomplished in a manner that will provide youth with an opportunity to acquire self-dignity and self-discipline, better work with and relate with peers and supervisors, and build lasting cultural bridges among youth from various social, ethnic, racial and economic backgrounds.

With this objective in mind, the development of team skills by the camp staff and participants is one of the most important activities in which they can engage. The materials presented in this section are only a few of the activities and methods that can be employed to attain the objectives.

Both staff and participants should become familiar with discussion skills and questioning skills outlined here. The saying, "None Of Us Is As Smart As All Of Us," readily applies to the program, and all can learn and benefit from the information generated from the application of these skills.

Other activities included here are designed to help the participants realize and identify feelings and values toward the environment, their lifestyle, and other people, in hopes of making them more responsive to their effect on their total environment.

I. SOLVING A PROBLEM THROUGH GROUP INTERACTION (from Michael Giammatteo, Ph.D.) Used most effectively by a camp staff at the first meeting as an ice breaker and to establish group problem solving.

We are concerned with techniques and processes of involving people in problem-solving activities. The success of these activities will be measured by the application of group interaction and problem-solving skill to the environmental investigations that we do later.

Questions and Discussion:

1. Have audience arrange themselves in groups of six, or have chairs grouped that way ahead of time.
2. Pass out the "6 Bits of Information" problem, one bit of information to each person. One complete set to each group of 6 people.
3. Tell audience that there is a problem to solve. They can tell their group what is on their paper, but they must not show it to others.

6 BITS OF INFORMATION PROBLEM

By Michael Giammatteo, Ph.D.
(Adapted for YCC
by Linda Bulcher & Betty Reinke)

B$_2$1

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

None of the crews worked more than one week on any one of the projects. During the third week Bob's crew constructed and installed gabions. The crews and staff agreed not to use the EA scorecard as a competitive device.

B$_2$2

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

John had worked with the YCC for five summers. During the second week, Bob's crew did the project that Barb's crew liked best. Each crew worked on their favorite project the third week of camp. The crews felt that they accomplished several objectives on the scorecard when doing the nature trail project.

B$_2$3

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

Barb's crew worked on the nature trail the first week.
Mike and Bob disagreed about how to set up the habitat study, so they talked with their crews to come to a consensus.
John's crew worked on the habitat the second week.
Each crew liked a different project best.

B$_2$4

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

Your group members have all the information needed to find the answer to the following question. Only one answer is correct. You can prove it.

IN WHAT SEQUENCE DID THE CREWS WORK ON THE NATURE TRAIL DURING THE FIRST FOUR WEEKS OF CAMP?

Some of the information your group has is irrelevant and will not help solve the problem.

B$_2$5

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

Bob's crew did their least favorite project the second week.
Mike's crew worked on a campground construction project the first week.
No crews ever worked at the same time on the nature trail.
Bob's crew did not like the campground construction project.

B$_2$6

Although you may tell your group what is on this slip, you may not pass it around for others to read.

Information:

The camp staff developed their scorecard to reflect the goals and objectives in the Source Book.
Each crew worked on the nature trail for one week.
Mike's crew liked the habitat study best.
Each crew leader worked with one crew during the first four weeks of camp.

4. As the problem-solving session progresses:

   a. 5-8 minutes into the problem, write on board -TRUST

   b. 8-12 minutes into the problem, write on board - VISUAL DISPLAY

   c. 12-15 minutes into the problem, write on board - MATRIX

TASK:	Identify and solve the problem in the "6 Bits" activity (see page 23 for the problem)

Questions and Discussion (after all groups have finished).

1. What kept you from solving the problem to begin with?
2. What helped you solve the problem later?
3. What were some characteristics of this problem-solving exercise? (List comments from the group and discuss)

The people who developed this problem-solving exercise feel that it contains elements of involvement that almost all groups go through; it also illustrates the way groups work together on common problems.

They hypothesized that the following things would take place during the problem-solving exercise. (Write each item on the board, or have a chart made up with the items listed.)

a. TRUST (will develop). You must trust that the instructor gave you a solvable problem. Must trust each other.

b. RITUALISTIC LISTENING (will take place)
   This is a type of polite listening - really without caring too much, because the data offered have no relevance at that time.

c. REAL LISTENING (will take place)
   When statements become more meaningful - data mean something. When people interrupt and say, "Say that again!"

Question: When in your group did you change from ritualistic listening to real listening?

When real listening occurs, three things will change:

Vision - Participants will begin to vision the listening by:

- really looking at other people
- constructing a Visual Display (writing data in a common place - helps make inferences

so that you don't have to listen to everything.

Space - Space factors will change

-- people will usually move closer together
-- people will sometimes change places, or move around the table.

Noise - Noise level goes up when groups start working together.

Using this type of activity at the beginning of a session is important for these reasons:

a. The problem could not be solved without the contributions of each person in the group.

b. People feel more committed to a session if they contribute by saying something, the earlier the better.

c. It is easier to talk to each other in a small group than to talk to one instructor in front of a large group.

d. This exercise illustrates that each person in a group brings information and skills that can be used by the entire group to solve common problems. THE PIECES OF PAPER REPRESENTED THE INFORMATION AND SKILLS THAT EACH OF YOU BROUGHT TO THE GROUP.

You will be concerned this summer with providing ways for each person to contribute knowledge, information, and skills to the solving of common problems. The content and activity itself are not always most important - what is important is the idea that you can use different techniques to get people talking to each other and contributing as a group.

NONE OF US IS AS SMART AS ALL OF US. (Printing this on the board during the problem-solving exercise helps in the understanding of the concept).

II. IDENTIFYING ROLES PLAYED IN GROUPS (From Michael Giammatteo, Ph.D.)

Roles played by people in the group affect learning as well as work. In order to work more effectively with groups such as crews or the camp staff, it is important to recognize some of the roles people assume in groups. Some are productive and some are nonproductive. MANY TIMES PEOPLE ARE NOT AWARE THAT THEY PLAY CERTAIN ROLES. (This activity would probably be most effective used with the camp staff.)

TASK A: 5 minutes (Use role playing slips on page 27)

1. Get into groups of four.
2. Each of you is being given a slip of paper with the role you are to assume--play it as convincingly as you can. (Cut up copies of the sheet with the roles on it.)
3. The Problem you are to solve is:

   It is 90°F outside. Your crew is on a work project and has to decide whether or not to go on a picnic by the stream. It is 2:30 p.m.

Questions and Discussion:

There are many roles, let us look at the four that you have just played.

Placator -- always soothes over the discussion.
"Everything in due time"
"The sun will shine tomorrow"

Attacker -- always attacks ideas presented or will be negative.
"You know the camp director will never go along with that"
"People don't care, our crew will never do that if we lose pay for taking off early"

Irrelevant -- ideas given that do not relate to the topic (evader).
"Did you see the movie last night?"
"Do you know what I dreamed last night?"

Sensible -- always tries to be as sensible as possible.
"Let's review where we are"
"Why don't we get back to the purpose of the meeting"

PLACATOR

*You are to play the placator role in solving the following problem:

*The Problem:

> It is 90^o outside. Your crew is on a work project and has
> to decide whether or not to go on a picnic by the stream.
> It is 2:30 p.m.

*Examples of Placator--always soothes over a discussion "Everything in due time" "The sun will shine tomorrow"

ATTACKER

*You are to play the attacker role in solving the following problem:

*The Problem:

> It is 90^o outside. Your crew is on a work project and has
> to decide whether or not to go on a picnic by the stream.
> It is 2:30 p.m.

*Examples of Attacker--always attacks ideas presented or will be negative. "You know the Camp Director will never go along with that" "People don't care, our crew would never do that if we lose pay for taking off early"

IRRELEVANT

*You are to play the irrelevant role in solving the following problem:

*The Problem:

> It is 90^o outside. Your crew is on a work project and has
> to decide whether or not to go on a picnic by the stream.
> It is 2:30 p.m.

*Examples of Irrelevant--ideas given that do not relate to the topic (evader). "Did you see the movie last night?" "Do you know what I dreamed last night?"

SENSIBLE (YOU ARE TO START THE DISCUSSION)

*You are to play the sensible role in solving the following problem:

*The Problem:

> It is 90^o outside. Your crew is on a work project and has
> to decide whether or not to go on a picnic by the stream.
> It is 2:30 p.m.

*Examples of Sensible--always tries to be as sensible as possible "Let's review where we are" "Why don't we get back to the purpose of the meeting?"

---

1. Some roles might be easier to play than others. Which were easiest to play? Which were easiest to identify?

2. Discuss with your group some instances where you have seen these behaviors in:
   Others Yourself

3. Refer below: "Other Roles Played in Groups" and discuss the categories and roles quickly.

4. Take 5 minutes in each group and discuss and list some ways to deal with the nonproductive behaviors just mentioned. (Task B)

Other Roles Played in Groups

A. Productive Roles -- which people assume to share in solving a problem or making a decision.

   1. Initiator -- suggests an idea, proposes a solution, says "Let's do this."

   2. Energizer -- prods the group to decision and/or action, stimulates the group, reminds them of the purpose of the group of meeting.

   3. Information Seeker -- asks for facts, for background information, for clarificaiton, helps group see need for sufficient information for decision-making.

   4. Orienter -- helps group define its position in relation to its goals (where are we now?), points to departures from goals or objectives, raises questions about the direction the group is moving (Where are we going?).

   5. Summarizer -- pulls together ideas, suggestions, comments or relevant information to help group understand where it is in its thinking or action process. (Gets us back on the right track)

   6. Encourager -- accepts and praises contributions of others, sets atmosphere of friendly acceptance, tries to arrange for everyone to contribute, gently urges group forward. "Let's work together." Aids approval of idea.

   7. Harmonizer -- points out similarities instead of differences, helps keep group on problems and away from personalities, works toward consensus. "It seems both your ideas are about the same." "That's a good idea but don't you think we ought to consider what Mary just added?"

8. Follower -- goes along with the group, passively accepts ideas of others, provides an audience for active members, supports through his presence. "I'll go along with that."

B. Nonproductive Roles -- which people assume to stop action. Roles that attempt to satisfy individual needs first.

9. Dominator -- tries to get his own way without regard for others; uses flattery, authoritative behavior, sarcasm, etc. Downgrades others' contributions.

10. Blocker -- tries to prevent something from happening, argues, openly rejects ideas, deals in personalities. Interferes with progress by going to tangents, personal experiences on unrelated things, argues unnecessarily on a point, rejects ideas without all facts, may weaken an issue.

11. Special Interest Pleader -- tries to gain decision or action favorable to a special group or project regardless of group wishes, uses stereotyped phrases or cliches, appeals to emotion, cites precedents, usually refuses to compromise, etc. States own biases, a special program for his personal gain.

12. Playboy -- makes a display of his lack of involvement in the group's efforts and activities, indulges in horseplay, unrelated jokes or comments, "penlicking" or "rubber-band snapping," or other attention-getting behaviors. "Anyone want some gum?" "Have you seen the new TV show?"

TASK B

Each group take 5 minutes and discuss and list some ways to deal with the nonproductive roles above.

a.
b.
c.
d.
e.

III. PROCESS AND PROBLEM-SOLVING APPROACH TO LEARNING - Observing And Classifying Tree Leaves - (by Ernie and Char McDonald)

(This activity is important to transfer some of the problem solving approaches from "6 Bits" to another activity, including the processes involved. It is suggested that you use tools or other familiar camp materials, instead of leaves, when this approach is used during staff or enrollee orientation. As camp progresses it can be used with tree, brush or grass samples, animal skulls or pelts, etc., in other environmental awareness investigations).

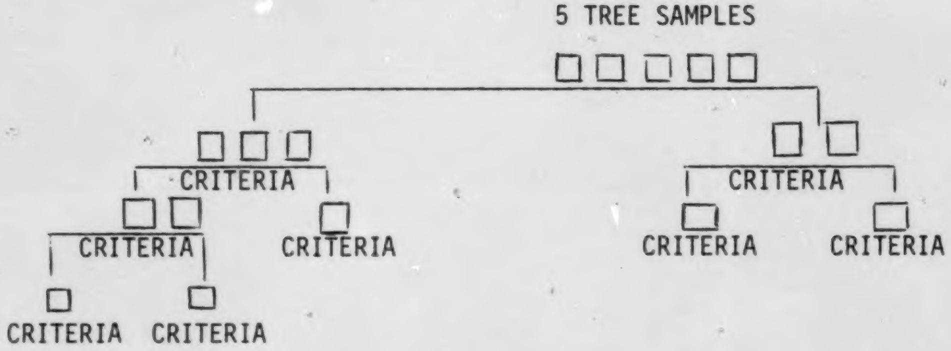
Divide into groups of five people. For this activity you will need one complete identical package of various leaf specimens for each group. Each person in the group gets one leaf specimen.

Questions and Discussion:

1. "Look at your own leaf specimen for 1 or 2 minutes and look for its observable characteristics. Since we are looking for observable characteristics, I don't want to hear any tree names."
2. Now have each person share what they observed about the characteristics of their sample with other members of their group.
3. Have each group put all of the leaf specimens into two piles based on the major likenesses and differences of the leaf characteristics. Write down the criteria or reason you used to do it.
4. Ask each group to tell the reasons used as you list them on the board. Point out that some groups used different starting points.
5. Your next task is for each group to construct a dichotomous key. What does dichotomous mean? (You may want to draw a sample key on the board to illustrate.)

   (Give each group a piece of paper and a felt pen. Tell each group to construct their key so that everyone can see it.)

TASK A Construct a dichotomous key using your own criteria or starting point for putting the samples into two piles. Divide each pile into two more piles of samples based on the major likenesses and differences of their leaf characteristics. Continue dividing piles until you only have one specimen left in each pile. (This is one way to make a key - you may want to use another way.)



TASK B: Now that you have finished your key, as a group: Select one sample, and using the words in the key that describe that sample, write a description of it in sentence form.

Questions and Discussion: (After most of the group have finished constructing their key)

1. Have each group read their description while the other groups select and hold up the sample they think is being described; have the members of the group that read their description check the other groups to see if they selected the right sample or not. (You may have to ask people to hurry so as not to drag out this part. It is important, though, for each group to read their description.)

2. After #1 say: I noticed that not all groups selected the sample being described and that not all groups started at the same point. If we assume we have as many different societies in this room as groups (each with our own way of working as a group, and each with our own language), then how could we use this classification activity to increase and improve the communication between society? (Committee, common vocabulary, etc.)

3. What else can we do with this key now that we've built it? Discuss groups suggestion, e.g.:

a. Demonstrate ability to use the key by adding a new tree sample. See if it fits into your key. Yes - no - why?

b. Describe the difference between your key and another one. (Change keys with the group next to you. See if you can match up the samples and then compare the 2 keys - yours and theirs.)

c. Take the key outside and use it to find trees where they are growing. (This is security for teacher and student - the student builds a tool and skill in the classroom and gets to use that tool and skill in the outdoor; the teacher doesn't need to know the names of trees to provide a meaningful learning experience for the student.)

4. Do you know more about the specimens now than when we started? We haven't even talked about names of these trees yet. Names may not be important to begin with. This classification problem allows us to become familiar with observable characteristics of the specimens. Now we are ready to use another written or picture tree key to associate our descriptions with others and to find a name that society has labeled the tree. (Use books like Petersen's Field Guide to Trees.)

TASK C: (15 minutes) Mark the processes used in this activity and give an example of how they were used. (Discuss in small group)

Process	Example of How Used
observing	
classifying	
measuring	
predicting	
inferring	
communicating	
formulating hypothesis	
experimenting	
interpreting data	

(Task C continued on next page)

Observing Using all of the senses: hearing, seeing, tasting, smelling, and feeling.

Classifying Identifying objects or ideas and classifying them into groups according to similarities and differences. Students are encouraged to invent their own systems.

Measuring Using both standard units of measurements of invented units, students should have experience in measuring quantities (length, weight, volume, time, temperature, etc.)

Predicting Many students guess with little difficulty. Prediction, however, requires a higher level of thinking. Predictions are also based on some known data or evidence. Simple graphs and charts are helpful for students to use as a basis for prediction.

Inferring The ability to infer is basic to the formulation of hypotheses. Students can learn to infer when they can distinguish between an observation itself and an inference about an observation.

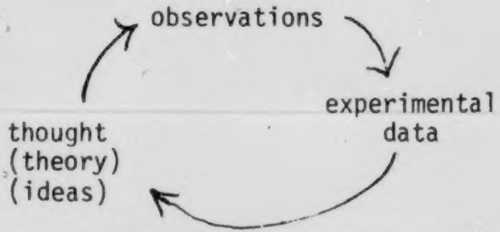
Communicating Clear and precise communication is essential in science. There should be many opportunities to communicate orally, with graphs, with pictures, and, when able, in their writings.

Other processes are more complex and are dependent on the foregoing processes.

Formulating Hypotheses Answers to many inquiries are simple. Many questions may be answered by asking an authority or by referring to the proper book or reference material. Answers to other inquiries require much further scrutiny. The student's initial general observations and informal manipulations may result in an attempt to investigate further or to experiment. A hypothesis based on his preliminary experience and his inferences is necessary to establish the direction of his efforts. Formulating intelligent hypotheses takes practice.

Experimenting Experimenting, as opposed to verifying, indicates a quest for an understanding of an uncertain phenomenon or an answer to an unsolved problem. The organization of this task is usually complex and takes many forms. One important aspect of such activity is the setting up of controls with which experimental results may be compared.

Interpreting Data Through observation and measurement, students will collect data. Can they organize and interpret these findings? True inquiry may begin with theory, observations, or experimental data, but the logical investigator always goes "full circle" regardless of his starting point.



IV. TEACHING PROCESS SKILLS - SURVIVAL VALUES OF LEARNING

(Best done with the camp staff following III - Process and Problem-Solving Approach to Learning)

A major goal of teaching process skills is to develop the ability within each individual learner to function autonomously at the inquiry and proof level; i.e., the ability to obtain, organize, translate, interpret and apply bodies of knowledge and to present proof of the validity of the process.

Give each person a Survival Values in Learning Chart (page 35)

1. In groups of 3-4, discuss the chart and answer the two questions at the bottom.
2. Have groups share their ideas about the implication of the chart.

Some Implications about the Chart: Survival Values in Learning

This chart relates to what you learn, not to how you learn it.

The lasting or survival value of learning some things may not be a very productive use of our time. According to the chart we only remember about 35% of the facts and 50% of the conceptual schemes shoved at us after only 3 months.

We retain the ability to manipulate and operate things (machines, tie shoes, write, etc.) up to 70% of the learning experience. If the learning experience were designed for us to develop thinking skills and processes (gather, sort, analyzing, interpret, and provide alternate solutions about problems) we could retain those skills at the 80% level of usefulness.

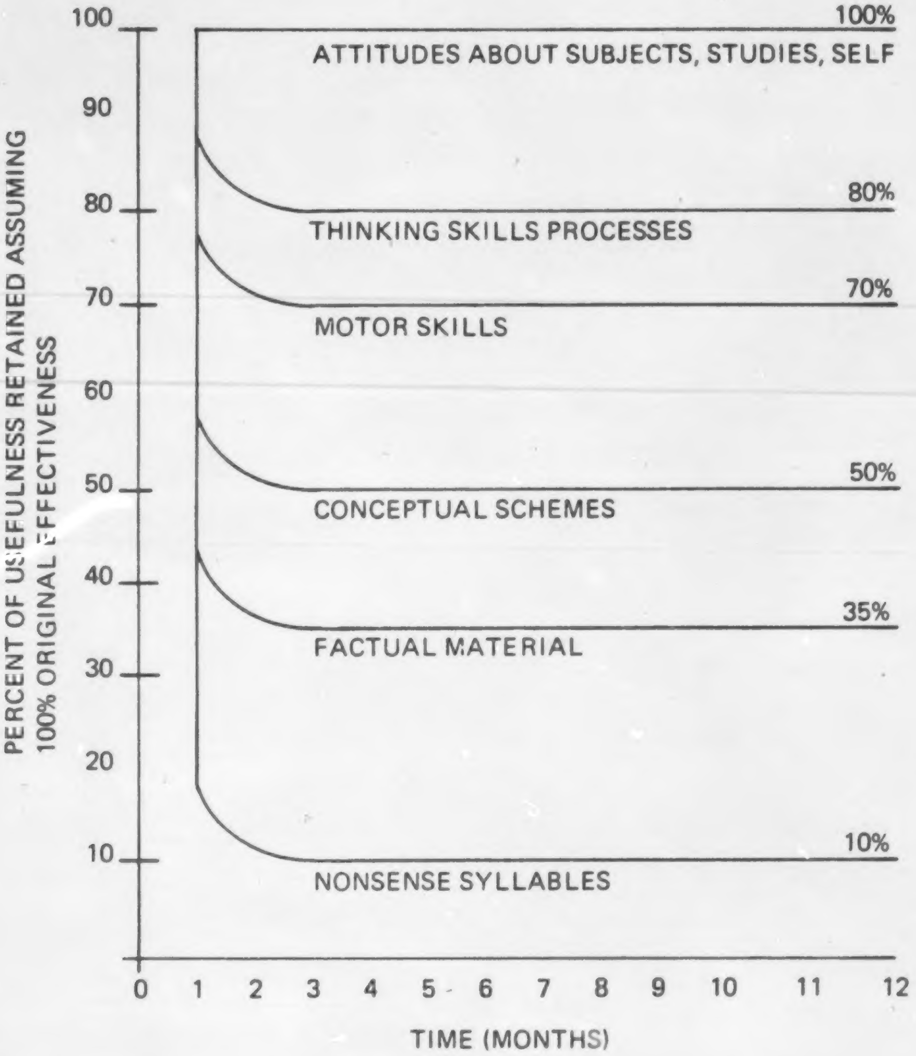
Therefore, we might assume that a person who has developed the ability to think for himself can collect and analyze factual data, develop a line of reasoning or contribute to the interpretation or solution of a problem or decision. Many times the learning experience deals only with memorizing facts and other information or concepts with no chance for putting that knowledge to work for us.

Before planning environmental awareness activities, ask yourself--

1. What am I doing this for? To help people memorize facts, learn concepts or think for themselves.

Survival Values in Learning

Used in the Higher Level Thinking Ability Course - Northwest Educational Research Labratory - as an interpretation from *Educational Psychology* - Cronbach Harcourt Brace & World 1963.



This chart shows the retention rate of different categories of learning. In small groups discuss and answer the following questions.

What does this chart say about the retention of learning?

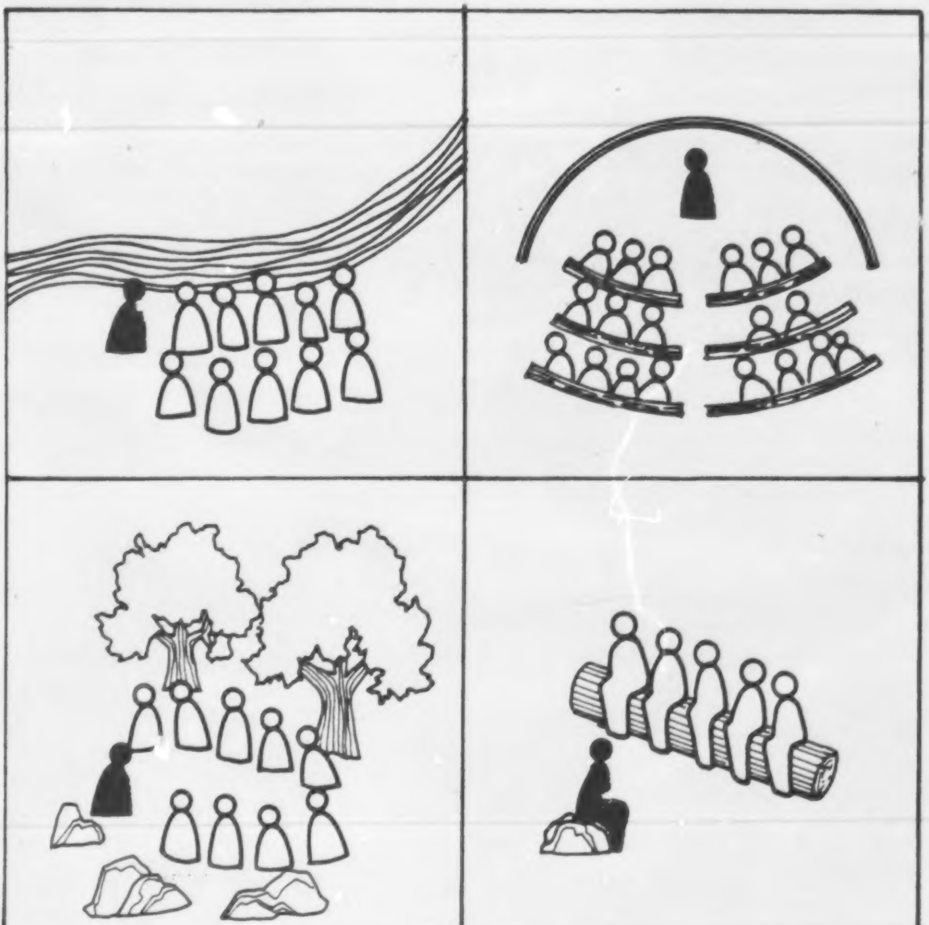
What are the implications of this chart to the way we plan learning experiences?

2. How can I structure learning experiences to insure participation and the development of thinking processes along with the use of factual data, etc.?

We are now recognizing that if we develop thinking skills and processes of investigation, we may begin to change behaviors. Only by actually involving people in environmental learning experiences can they begin to think about their role in environmental management. We must be concerned with developing environmentally literate persons who can think for themselves.

V. PLANNING GROUP ARRANGEMENTS

TASK - Answer the questions below:



Which group arrangement:

suggests 'we talk, you listen' or 'you talk, we listen'?

suggests limited 2-way communication (audience responses directed at one person)?

will allow for maximum participation by the most number of people for the most time (where people talk to each other)?

will allow a maximum quantity of information to be presented in a fairly short time?

will allow input from all participants on an equal level?

What does this exercise tell us about group arrangements?

VI. STAGES OF GROUP GROWTH (From Michael Giammatteo, Ph.D.) - Good for the camp staff to look at several times throughout the summer, especially crew leaders

Every group has to spend time and energy learning how to work together. Usually some feelings develop among members while they are learning.

It takes time for group members, each different, to learn how each can fit into the group and contribute best. So things often seem "all mixed up," and group members may quite naturally become disturbed and discouraged - even aggravated with each other.

It helps to know that these are natural "growing pains" of democratic groups, that these feelings among members tend to follow a predictable cycle or sequence, and that in most cases the group will soon become productive and efficient as people work to solve group problems.

Let's take a look at the stages in this developmental process.

1. "Groping": When the group is first finding out how to plan and work together they may not all agree. They don't know and understand each other well enough to really trust the group, and they still have to determine each others' skills, knowledges, situation, and attitudes. So they often feel uncomfortable and lost.

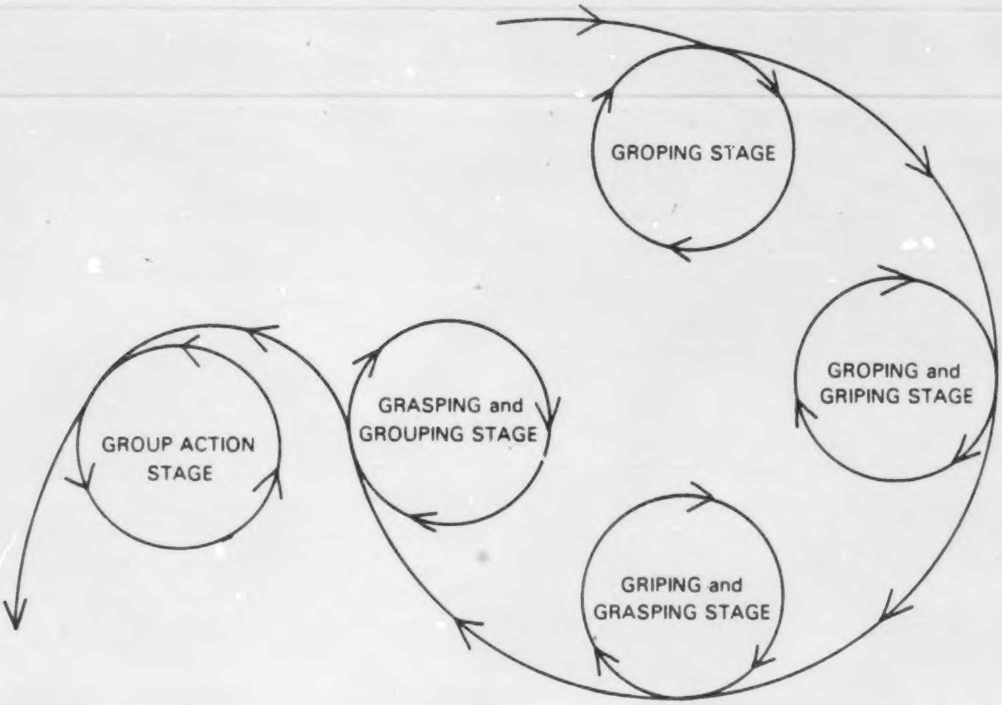
2. "Griping": The group gets discouraged when they can't seem to work together, when there isn't much progress, and their attempts are frustrated. They say wrong things to others, play negative roles and block group action because they are uncomfortable. This is the place for more "self-other" understanding, to remember that they are all different but they all want to do a good job and be liked by others. Maybe they can learn to understand why others are griping, and learn to give themselves time to work things out.

3. "Grasping": Now ideas and suggestions are beginning to fit. The group begins to agree on questions, and can start to see some direction to group activity. Everyone begins to feel more comfortable and now they are getting somewhere.

4. "Grouping": They are really getting to know each other, and can understand and enjoy how each one works and fits into the tasks to be done. Group tasks, building, and maintenance roles come into play, and a surge of enthusiasm spreads through the group.

5. "Group Action": Now the group is in full swing, with members playing constructive roles, leadership shared, everyone participating. It was difficult at first, but worth it to learn to work well together. They have shared in making plans and decisions, have learned together, and feel this is a good group with which to work. They are busy making their group more democratic.

Following is a picture of these feeling stages people go through together as they work at problems they all want to solve.


GROPING STAGE
GROPING and GRIPING STAGE
GRIPING and GRASPING STAGE
GRASPING and GROUPING STAGE
GROUP ACTION STAGE

Now they are ready to tackle other jobs. It can be expected they will still go through some of these early stages, but each time it can be less disturbing, more effective.

So it is important to recognize how they feel about others in the group, to know that these feelings are natural whenever they really tackle important jobs, to realize that the group can move ahead toward better feeling relations among members. As they get to know each other better, this group gradually becomes their group because they have shared plans and work, and have tried to practice ways of behaving which are cooperative, considerate, friendly, democratic.

TASK In small groups of 3, list examples of the different stages of group growth we have experienced.

List the factors that might affect different stages of group growth.

CHAPTER 4 - ECOLOGICAL PRINCIPLES AND ENVIRONMENTAL CONCEPTS

by Paul Yambert and Jerry Gaffaney

One premise of the YCC environmental awareness program, as stated in the initial introduction of this Source Book, is that each YCC program is, and should be, unique. There are, however, basic biological/ecological concepts which are applicable to all program areas. As these basic concepts are important to an understanding of the cause-and-effect relationships in the environment, some of these have been described in the following pages. Additional information on these can be obtained by consulting some of the source materials listed in the bibliography.

BIOTIC SUCCESSION

The various developmental stages of soil formation from bare rock or water are characterized by changing biotic communities. Each community promotes the process of soil formation by exerting various physical and chemical effects which lead to more rapid decomposition of parent materials. Lichens and mosses first invade the surface of a bare rock. As the rock begins to decompose and organic materials build up, annual grasses and forbs replace the initial invaders. This process of material buildup and plant replacement tends to continue until a deep rich soil has been formed and a permanent plant community established.

The role of plants in soil formation illustrates another process fundamental in any ecosystem and basic to much work in conservation. This is the process known as biotic succession. The way in which lichens and mosses are replaced by grasses and forbs and these by shrubs and trees as soils are being formed is an example of biotic succession. Along with the replacement and change in types of plants go replacement and change in the animals dependent upon such types of plants. Biotic succession can be defined as the sequence of biotic communities which tend to succeed and replace one another in a given area over a period of time. The starting point in any biotic succession is a pioneer community able to colonize and inhabit any bare surface. The end product in succession is known as a climax community. This, as a relatively stable community, is able to maintain itself over long periods of time and to regenerate and replace itself without marked further change.

Pioneer Community ⟶ Intermediate Communities ⟶ Climax Community
(Initial invaders)

Throughout the earth, wherever life can be supported, biotic succession goes on. Plants invade and colonize bare areas and are replaced in time by other groups of plants. Succession takes place on bare rock, sand, and exposed alluvium in river bottoms, and in water. Citing various successional stages in one of these given areas may help you understand this process of change.

A lake or pond tends to be invaded by aquatic plants which are replaced in time by partially submerged reeds and rushes and these in time by sedges and grasses. The aquatic succession is made possible by the accumulation of soil materials washed into the lake accumulating around the bodies of plants and being added to by dead plant debris. Eventually, unless the process is disturbed, each lake changes to a pond, the pond to a marsh, the marsh into a meadow or forest.

Successional stages on a given area may take hundreds of years to go from pioneer plants through the intermediate stages to the climax vegetation. A human lifetime is not long enough to witness all the successional stages which may occur on a given area. Still, the process of biotic succession is ever present in our ecosystem through the continuous relocation of biotic communities.

Succession can also be applied to urban environments. The changing of farmland to suburban homes, to high rise buildings to the downtown urban area. These urban successional stages are analogous to biotic succession but are not as predictable since man controls which will be the climax community.

On the following pages are sample sheets from the YCC Environmental Awareness Pocketbook that should be helpful in integrating these ecological concepts into the projects.

FOOD CHAINS

Our American community is not a typical human community. One-fourth of the people in it are able to produce most of the food for the other three-fourths and these latter earn their living in some way which is not related to food production. Moreover, the food we eat comes not from the particular habitat in which each of us lives, but from every kind of climatic zone and from all parts of the world.

We can only comprehend the meaning of our "atypical human community" when we understand the basic relationships inherent to a biotic community. "A biotic community is an interdependent group of plants and animals living in a particular habitat or in a restricted area." The individuals within a community rely solely upon each other for survival. The major activity of all the individuals within a community is the securing of food for sustaining life. Our human community then becomes atypical.

All members of a community are linked together by their eating-eaten relationships, so we can make a good start at understanding the community by following these linkages, which we call food chains.

PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION

(By Ernie and Char McDonald)

Possible Projects:
Tree eradication from a meadow
Gabbians for stream erosion (formation of alluvial fan)
Rehabilitation work after a burn
Insect or parasite such as mistletoe infestation
Fuel modification for fire protection
Range improvement
Not tied to a project, but used at a campout

Materials and Needs for Investigation

1. Pencils
2. This investigation sheet from handbook
3. CHOOSE AN AREA FOR THIS INVESTIGATION WHERE AT LEAST TWO PLANT COMMUNITIES OF THE BIOTIC SUCCESSION CAN BE SEEN.

Time: 30 minutes to 1 hour including discussion

1. Use as introduction to project if biotic succession is the major ecological principle e.g. tree eradication from a meadow.
2. Activity during the project as comparison with another community or project or strengthen environmental awareness.

Behavorial Objectives

Identify pioneer, intermediate, and climax communities of the area of the project, including present stage.

Identify physical, biological and (sociological) factors which have caused the change and importance.

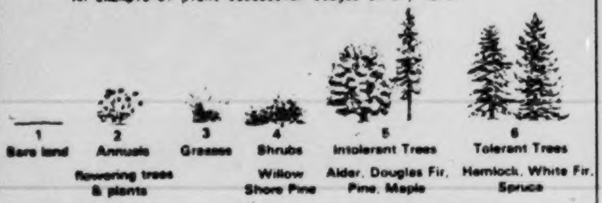
Determine effects of work on succession.

Compare the succession of this plant community with a different plant community in the area of YCC activities.

PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION

An Inventory of Biotic Succession

An example of plant succession stages on dry land:


1
Bare land
2
Annuals
flowering trees & plants
3
Grasses
4
Shrubs
Willow
Shore Pine
5
Intolerant Trees
Alder, Douglas Fir, Pine, Maple
6
Tolerant Trees
Hemlock, White Fir, Spruce

Pioneer Community   Intermediate Community   Climax Community

TASK - Observe a plant community in your area and record observations about the different stages of plant succession that you notice.

Stage	Plants	Animals
No. ______ (Name)	______ ______ ______	______ ______ ______
No. ______ (Name)	______ ______ ______	______ ______ ______
No. ______ (Name)	______ ______ ______	______ ______ ______

Discussion: From your observations, what changes have taken place in the area?

1. One person could list these on a small chalk board, or a full-size sheet of paper on a clip board for the group.

2. Focus on 2 or 3 items for discussion: Why did you say... What could account for... What are some things that could account for...?

PLANT FIELD INVESTIGATION - BIOTIC SUCCESSION

What changes are taking place now? (Could use same format as above)

What changes do you predict will take place in the future?

How (Has or will) your work in the area affect the change?

Compare the succession of this plant community with the succession of a different plant community in the area of your YCC activities?

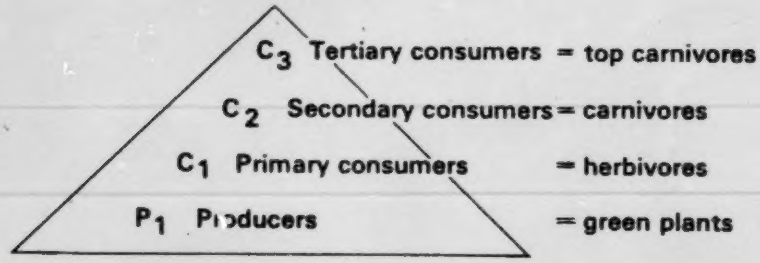
Compare the biotic succession here to succession that occurs in your communities at home.

Generally, food chains follow a general pattern:

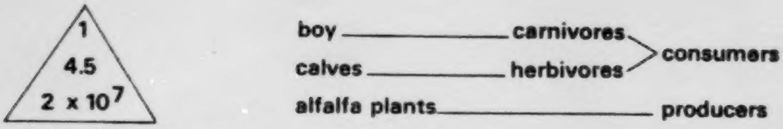
GREEN PLANTS ⟶ HERBIVORES ⟶ CARNIVORES ⟶ STILL LARGER CARNIVORES

and so on until we come to a "top carnivore" that has no larger predators.

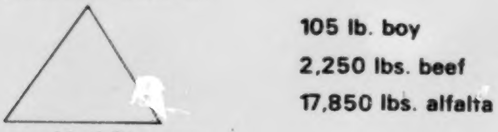
These relationships within a community are often illustrated in diagrammatic ways such as the biotic pyramid.


C_3 Tertiary consumers = top carnivores
C_2 Secondary consumers = carnivores
C_1 Primary consumers = herbivores
P_1 Producers = green plants

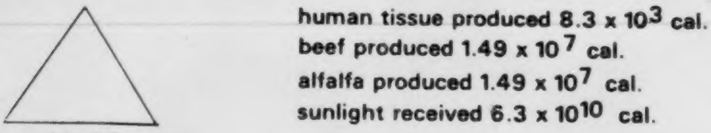
The number of individuals within a community is determined by the amount of energy available in green plants and by the efficiency of individuals within the community in converting this to a form useful for maintenance, growth, and reproduction. In the biotic pyramid the greatest numbers of organisms, the greatest mass, and the greatest amount of food energy are to be found in the lowest layers of organisms, the green plants.


1
4.5
2×10^7
boy
carnivores
calves
herbivores
consumers
alfalfa plants
producers

Pyramid of Numbers


105 lb. boy
2,250 lbs. beef
17,850 lbs. alfalfa

Pyramid of Biomass


human tissue produced 8.3×10^3 cal.
beef produced 1.49×10^7 cal.
alfalfa produced 1.49×10^7 cal.
sunlight received 6.3×10^{10} cal.

Pyramid of Energy

As we move up the pyramid, energy is lost to the carrying out of necessary life processes. Food consumption, digestion, and utilization are all processes which consume available energy within a food chain.

Thus far, we have cited examples of food chains only within the human community. But the basic principles of the food chain apply to all living communities, the only variations being the individuals concerned and the number of possible links within the chain. The sequence in an aquatic environment could be:

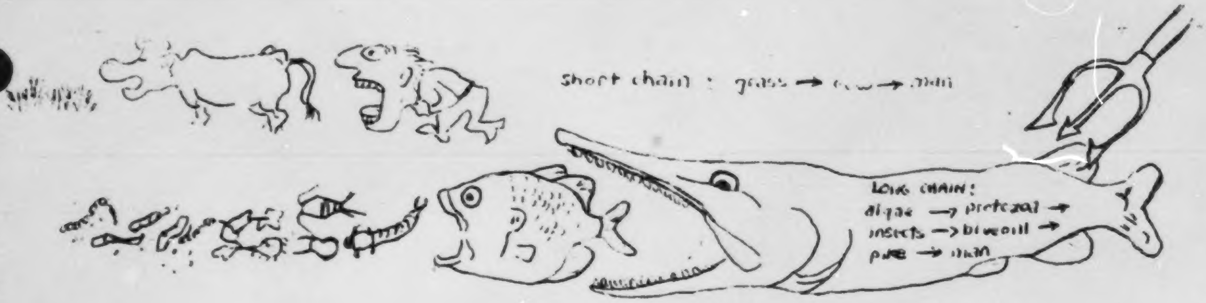
algae ⟶ ciliate ⟶ small aquatic insect

large aquatic insect ⟶ black bass ⟶ pickerel

In a meadow, with small herbivores, there might be five links:

grass ⟶ cricket ⟶ frog ⟶ snake ⟶ hawk

Another way of diagramming food chains is the drawing below:



FOOD CHAIN - A chain of organisms in which each link feeds on the one ahead and is eaten by the one behind.

One of the most basic relationships within the biotic community is the food chain. Each individual within a chain relies upon another individual for its necessary food. Every link in the chain becomes important for the survival of the entire biotic community.

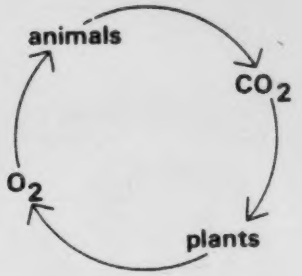
Food chains are emphasized as a means of beginning to understand the more complex interrelationships within the ecosystem. Food chains are parts of food webs: food webs help us understand energy and nutrient cycles: these cycles, in turn, give us insight into the functioning of the entire ecosystem.

BIOCHEMICAL CYCLES (OXYGEN, NITROGEN, AND CARBON)

All living things, plants and animals, are constructed from certain basic chemical elements such as carbon, hydrogen, oxygen, nitrogen, and phosphorus. There is only a limited supply of these elements in the world. For life to continue, these elements must be recycled in our environment, to be used over and over again in the formation of life. Every organism--every tree, shrub, insect, bird, and mammal found in our environment today--is thus made from the elements that once were parts of other living things. Your own body contains "second-hand" materials," atoms of which were once those of a giant dinosaur that may have roamed through prehistoric swamps.

OXYGEN CYCLE

How then do these elements recycle? Let us, first of all, look at one of the basic elements essential to life--oxygen. The food-making process which occurs in plants (photosynthesis) has a by-product, molecules of oxygen. As glucose (sugar) is formed from water (H_2O) and carbon dioxide (CO_2), oxygen from the water molecules is released into the air. Since all plants and animals, including man, need oxygen to live, and since no animal can release oxygen, the supply soon would be exhausted if the plants did not continuously replenish it. The cycle, in oversimplified form, may be sketched like this:



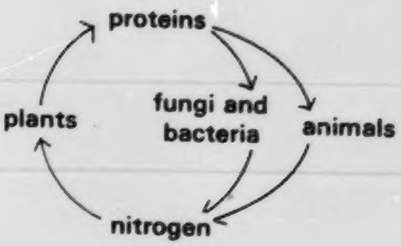
Oxygen Cycle

Green plants are, therefore, the foundation upon which the rest of life is built, for they are the source of all the food we eat and they release the oxygen we breathe.

NITROGEN CYCLE

One of these essential nutrients which is required in large quantities by plants is nitrogen. Plants utilize nitrogen in the growth processes and store it in the form of protein. A plant which utilizes nitrogen in such a manner is corn. If the corn is being raised as an agricultural crop, it may be harvested and stored by the farmer to be fed to cattle. While the corn is stored, a mouse may use it as a food supply and a cat, in turn, may utilize the mouse for food requirements. Assuming the cat is not eaten by a larger animal, it dies and begins to decompose. During this decomposition process, the protein which has been carried throughout the cycle is broken down by bacteria and fungi into a useful form of nitrogen. The nitrogen cycle may be sketched in this manner:

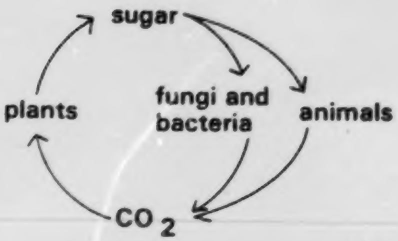
Nitrogen Cycle



CARBON CYCLE

The carbon cycle is also related to plant and animal relationships. Plants remove from the air the carbon dioxide expired by animals. The carbon follows a path similar to the oxygen in forming glucose. The carbon is then contained within the plant body to serve as a food for animals, or to be returned to the soil when the plant dies and begins to decay. Respiration by animals returns carbon dioxide to the air, and the process repeats itself. The carbon cycle may be sketched like this:

Carbon Cycle



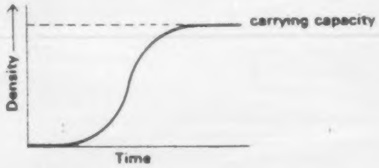
Under natural conditions, there is a constant turnover of nutrients in any natural area. Minerals go from soil to plants to animals and are eventually liberated for reuse by the process of decomposition.

CARRYING CAPACITY

Any environment has a limited amount of resources, including energy, and can, therefore, support a limited amount of life.

As a population of individuals increases in numbers, it also increases in density. More individuals in an area mean more demands on the available resources. When the resources are serving as many individuals as possible, and those individuals are living in optimum conditions, the environment has reached its carrying capacity. The carrying capacity, then, determines how many organisms can be maintained and in what condition.

As shown in the figure below, density can increase until resources are being used at their maximum. The population will then level off. If density rises above the carrying capacity, either the number of individuals or the quality of living or both will be reduced.



In 1906, Arizona's Kaibab Plateau supported 4,000 mule deer in its forests and meadows. Also in that year the area was made part of the Grand Canyon National Game Preserve. Public hunting was stopped, and government officials began a campaign to eliminate predation. Thirty wolves, 554 bobcats, 781 mountain lions, and 4,889 coyotes were killed in the next few years. With no human or animal predation, the deer herd shot up to 100,000 in 1924. That was too many for the environment to support, and deer started dying of disease and starvation by the thousands. Eighty to ninety percent of the forage was destroyed completely. Today, the herd has lowered its numbers to 10,000, the vegetation has returned, and ecologists are using the Kaibab deer herd has a classic example of a population surpassing the carrying capacity of its environment.

BIOMASS

Energy and resources are converted through food chains to biomass (living weight). A 160-pound man has a biomass of 160. A deer may have a biomass of 75.

Given an environment with its limited resources, a fixed amount of biomass can be produced, and no more. Ten acres of farm land can supply 17,850 pounds of alfalfa, or 2,250 pounds of beef, or 105 pounds of boy. If grasshoppers move in and eat the alfalfa, converting it to their biomass, the beef or the boy will receive less energy, and consequently, their biomass will soon be reduced.

LIMITING FACTORS

Activity within the biotic community is ceaseless as energy and materials flow through food chains. Change is also ceaseless, being represented by the growth and death of individuals and populations by the process of biotic succession, or the slower process of species evolution.

In the environment, life may be distinguished by reproduction, growth, and the ability to move about. All species that exist tend to increase in numbers, move to more suitable environments, and there again to reproduce and spread farther. Growth in individual size or in numbers continues until some external factor of the environment causes it to cease. A tree will cease to grow when essential soil nutrients are no longer available in required quantity. Particular tree species within a forest will cease to reproduce when forest floor conditions become undesirable for seed germination. Animals too will be affected when minimal availability of food, water, and shelter ceases. Whatever factor limits the reproduction of a population or the growth of an individual is known as a limiting factor. The ecological principle of limiting factors may be stated as follows: "The presence and success of an organism or a group of organisms depend upon a complex of conditions. Any condition which approaches or exceeds the limits of tolerance is said to be a limiting condition or a limiting factor." The limiting factor may be considered as an ecological "bottleneck" which sets a limit upon the productivity of an entire ecosystem. One important facet of resource management deals with compensating for limiting factors in a given habitat.

Limiting factors can be divided into two categories: physical and biological. Physical factors which might limit population growth would include factors of climate and weather, the lack or the overabundance of water and minerals, the suitability of terrain, plus many other factors. Biological factors include competition, predation, parasitism, disease, and other interactions within or between species that are limiting to growth or increases in numbers.

The concept of limiting factors combined with the knowledge that the earth is limited in size and in its supplies of energy and materials leads to the obvious conclusion that growth and expansion must eventually have an end. No species, including man, can expand its population indefinitely. Absolute limits to growth are set by the density-dependent factors - the factors which determine the number of individuals that can be supported by an area. In crowded human populations in many parts of the world, we see such density-dependent factors in operation. This knowledge can help us to understand and avoid such problems as starvation, pollution, and disease associated with population densities exceeding the carrying capacity.

INTERSPECIFIC AND INTRASPECIFIC COMPETITION

All living organisms interact within their environment. Plants and animals (including humans) interact within the biotic community, and man interacts within the human community. Colleges and universities throughout the nation represent separate communities with a particular group of individuals interacting through campus activities. An example of such activities might be an intramural athletic program. Literally translated, intramural means "within the walls." Therefore, a specific group of students (e.g., Southern Illinois University students) competes in some form of athletic competition.

In contrast, these separate communities may interact with one another. To cite athletics again, the program of competitive sports would be termed intercollegiate athletics; in other words, competition among various "species" of students.

The distinction of competition within a species or among species is also present in the biotic community. Plants make their own food through the process of photosynthesis, but this does not mean that plants can make their own energy. For a plant to carry out its foodmaking process, it must utilize sunlight as its source of energy. Among plants, then, the struggle for energy is chiefly competition for a place in the sun. Competition between plant species for energy is called interspecific competition. If we were to consider only one species (e.g., white oak trees), competition within this species for a place in the sun would be termed intraspecific competition.

Competition occurs among all living organisms for space, food, water, and other necessary life supplies. On our earth we have a limited supply of these necessities. As a population of individuals increases, competition becomes greater.

ENVIRONMENTAL CONCEPTS

Pollution and consumption of natural resources are inexorably interrelated with each other and to our environmental crisis. The two chief factors contributing to resource consumption and consequent pollution are the number of people and the consumption per capita. Any effective environmental education program must deal with consumption and pollution as interrelated, not independent, factors.

With these generalizations in mind, we can formulate the following environmental corollaries:

A. We should find ways and means of reducing our consumption of resources through:

   1. More efficient use of resources.

   2. Nonconsumptive use of resources.

   3. Nonuse of resources.

B. We should find ways and means of reducing the ecological impact of our necessary consumption of resources by:

   1. Substituting renewable for nonrenewable resources where feasible.

   2. Avoiding consumption patterns which result in non-biodegradable waste.

   3. Insuring recycling and reutilization of waste.

In this context, we have a frame of reference conducive to changing attitudes both toward knowledge of the environment and man's place in it.

EXAMPLES IN THE YCC PROGRAM

Assuming acceptance of the value system outlined above, we can visualize a spectrum of activities ranging from the relatively undesirable, through the material, to the relatively desirable.

Projects

Building a snowmobile trail implies acceptance of nonessential consumption of nonrenewable resources in a manner which is potentially destructive to the ecosystem, especially the atmosphere. On the other hand, the snowmobile trail may reduce destruction to other parts of the environment and preserve its overall diversity. Such tradeoffs must be considered.

Building a hiking trail implies encouragement of a form of resource use which is nonconsumptive and nonpolluting to a very large extent. The tradeoff choice will be affected by such factors as littering, unauthorized chopping of wood, careless use of fires, and disturbance of wildlife.

Dining Hall

Using disposable plastic plates, cups, and flatware implies acceptance of the use of nonrenewable resources in a highly consumptive manner which is likely also to result in large amounts of air pollution.

Using plates, cups, and flatware which are reused after cleaning with biodegradable detergent and sterilizing with hot water from an efficient and properly insulated heating unit implies concern for minimizing negative impact on the environment in general and upon nonrenewable resources in particular.

Recreation

In choosing whether to make a trip by canoe or motorboat, some of the considerations which should be taken into account are:

1. Which will cause less air pollution?
2. Which will cause less water pollution?
3. Which will cause less noise pollution?
4. In what ways will the trip by motorboat provide more satisfaction?
5. In what ways will the trip by canoe provide more satisfaction?

In this, as in any form of tradeoff analysis, it is important to consider ramifications over time. For example, making an aluminum canoe results in considerable environmental impact, but using it over an extended period of time may reduce the average impact per hour of recreation to a very acceptable level. The underlying concept is one of amortizing environmental impact over time.

ENVIRONMENTAL DESIGN AND ACTIVITY CHECKLIST

Generally, the kinds of work projects attempted by the YCC can serve as major segments of the educational program. It is difficult at times, however, for the work supervisor or educational specialist to incorporate the work experience into the educational program. It is virtually impossible to develop a lesson for every kind of work project. For this reason, a generalized checklist has been produced to facilitate the transition from work project to environmental education on page 14.

CHAPTER 5 - ENVIRONMENTAL AWARENESS SCORECARD

by Jerome Johnston

The Environmental Awareness Scorecard is one method of planning and mapping out the integrated environmental awareness work program. It was developed by Jerome Johnston from the University of Michigan in 1975. Many camps are now using the Scorecard approach. It is presented here as a guide for your use, whether in full or in part.

THE SCORECARD PROGRAM IN BRIEF

To understand the scorecard program, the reader should be familiar with three key terms.

Behavioral Objective. A behavioral objective is a statement which describes an action to be performed by a learner; in the case of YCC, a behavioral objective is an action which a YCC enrollee must perform to fulfill a goal of the environmental awareness program. There are three basic elements contained in a behavioral objective:

1. Identify the terminal behavioral expected of a student.
2. Specify the conditions under which the behavior is to be performed.
3. Specify the criterion of acceptable performance.

A Behavioral Objectives Approach. Following a behavioral objectives approach, each camp generates a collection of behavioral objectives. In choosing the content areas for these objectives, the camp staff follows the environmental awareness (EA) goals and objectives on pages four through seven. The set of behavioral objectives defines the camp's environmental awareness program. The result is a program in each camp which is tailored to meet the unique strengths of the staff, the available resources, and the work projects which need to be done.

Scorecard. For record keeping purposes, the camp's objectives are entered into a scorecard--a simple device on which each enrollee tracks his progress by having a staff person initial each objective when it is satisfactorily accomplished.

The behavioral objectives approach to EA program development in YCC could result in a national program which will have both unity and diversity. Since each camp staff will follow the same national guidelines for EA programs, all camps will have similar programs in that certain content areas and principles will be covered. At the same time, each camp program will be unique in that the ways which enrollees experience or learn about these topics will vary greatly from camp to camp.

The method of defining the environmental awareness program in terms of behavioral objectives can be thought of as a results-oriented approach to teaching. In most educational programs, the goals of the program are stated in terms of broad areas of content which are to be covered by the teacher. A teacher then translates these into more specific plans of action which describe what the teacher will do to cover the material. Usually, these plans do not describe what outcomes will be expected of the learner as a result of being exposed to the teacher's actions. In contrast, behavioral objectives describe specific expectations for the learner. Some examples may clarify these distinctions.

Program description:	The program will cover the analysis of soils, including the use of a Lamotte Soil Testing kit.
Teacher plan:	Show enrollees how to analyze soils using the Lamotte Soil Testing kit. Draw samples from soil pit behind mess hall. Cover the basic characteristics of soils.
Student/enrollee behavioral objective:	Using the Lamotte Soil Testing kit, the enrollee will analyze a sample of soil and identify its (1) texture, (2) structure, (3) pH, (4) temperature, and (5) color. The enrollee will also specify two ways in which man can alter each of these five soil characteristics.

The program description describes the general content areas which will be covered in the course of the program. The teacher plan does not say much more because it is only an outline for the teacher. The words should be sufficient to remind the teacher of material which he has in mind to cover; people other than the teacher would have difficulty determining at what "level" the instruction would be conducted. Defining what the teacher expects from students would entail attending the class presentation and examining the assessment instrument--the test in which the expectations are made quite explicit. In contrast, the behavioral objective tells a reader immediately what will be expected of a learner. It is clear from the statement that a learner will not be expected to become a soil scientist, but then again he must do much more than simply attend a lecture on soils. In order to tell the learner the specifics contained in the behavioral objective, the teacher (camp staff) has to think through in advance precisely what will be expected from enrollees.

The behavioral objectives approach requires a camp staff to generate a complete set of objectives for the environmental awareness program and enter these onto a scorecard which is used by the staff and enrollees to guide the program through the season. An example of a portion of a scorecard from the 1975 experiment is shown on the next page. The complete scorecards from all four camps can be found in the appendix.

ADVANTAGES OF THE SCORECARD APPROACH

The biggest advantage to be realized from this approach is that it forces teachers (EA instructors, camp directors and crew leaders) to think through in detail the entire EA program prior to the arrival of campers. In the process of doing this, a staff must share and reach some concensus on philosophies of education, ecological priorities, and the fundamental knowledge base for a program in environmental awareness. In addition, the staff is helped to think through in advance the ecological program. This type of planning is essential in a program such as YCC which lasts for only four to eight weeks and which operates at a very rapid pace during that time.

In addition to planning advantages, the approach encourages spreading the teaching responsibilities throughout the staff. This can occur because prior to the beginning of camp, the staff discusses both the philosophy and content, so that the EA program is not the private domain of the EA coordinator. Inasmuch as some of the scorekeeping is done by crew leaders, the sense of participation of all staff in the Environmental Awareness Program is heightened. Another potential of the scorecard approach is that the responsibility for learning can be pushed even farther away from the EA coordinator by securing the participation of the learner himself in the educational process. This can occur when learners are made to feel that it is partly their responsibility to complete the behavioral objectives and seek out a staff person to obtain certification when he or she feels that the objective can be well demonstrated. When data from the scorecard are summarized in the recommended fashion, the data can serve as a helpful diagnostic tool for revising the EA program for a succeeding year.

RECOMMENDATIONS FOR IMPLEMENTING THE PROGRAM

Pre-camp training week. It is recommended that the staff training program in each camp include at least one day during which the EA coordinator works together with the rest of the staff to hammer out the final version of the scorecard. To the directors of some camps, this may seem like an inordinant amount of time to be spending on environmental awareness issues, especially when many other things may need to be done in order to prepare for the impending arrival of enrollees. However, this activity of generating and critiquing behavioral objectives for the EA program can be keyed to the organization and flow of the entire summer program. The scorecard is more than just an ancillary tool for evaluation purposes; it can guide the development of the staff approach to teaching and, more generally, to interacting with YCC enrollees.

PORTION OF A SCORECARD

Camper's Name ____________________________________

ENVIRONMENTAL LEARNINGS SCORECARD

Date and Staff Initials

SOILS

1. Using a soil sample kit: ________
   a. Correctly draw a sample of soil
   b. Identify the pH, nitrogen, phosphorous and potassium levels in the sample

2. Correlate flora with soil type, identifying two species that correspond to each part of the pH range ________

3. Explain what indicator species tell you about soil pH in an area. ________

4. Define succession. ________

5. Define and distinguish among sand, silt, clay, humus. ________

6. As a part of a sedimentation study, determine the fractions of each soil type. ________

INVERTEBRATES IN WILDLIFE AREAS

7. On visits to four different areas: ________
   a. Collect invertebrates in a "kill" jar
   b. Identify the characteristics of each invertebrate (body, legs, wings, and other obvious external features)

8. Develop a dichotomous key for the invertebrates. ________

9. Describe ways in which the invertebrates of each area are the same or different and give reasons for the difference. ________

DRIGGS RIVER VISIT

10. a. Using a compass, determine the location of N, E, S, W. ________
    b. Using the sun and physical features, get to the Driggs River from your starting point. ________

In most camp situations it is not practical or even desirable that the entire staff generates all of the behavioral objectives from scratch. Indeed, it is rare for staff members other than the EA coordinator to feel capable of describing an entire EA program. Accordingly, it is recommended that the EA coordinator generate a first draft of the behavioral objectives for the camp and present this draft to the staff during the training week. The task for the staff is to talk among themselves and critique the objectives. This activity requires considerable time, especially as various staff members find out that their views of the educational program differ from that of others on the staff. The staff is likely to make only minor changes in the objectives that are presented to them. Even so, whatever changes are suggested come after much discussion about what the EA program is all about, and the discussion will make them much more effective as teachers.

In a situation where a large number of the staff has extensive backgrounds in environmental awareness, the EA coordinator may choose to specify much less of the program than suggested above. He might provide only a skeleton of the EA program and have the rest of the staff generate all of the specific behavioral objectives. An EA coordinator who chooses this route should be aware that a great amount of time can be consumed in trying to construct a set of behavioral objectives which is extensive enough for an entire summer's program.

Environmental Awareness Coordinators should be warned to expect great resistance to the idea of writing a set of behavioral objectives for the EA program. This resistance will arise because of a misconception that most people have about the nature of behavioral objectives. It is frequently thought that behavioral objectives restrict an educational program by focusing on facts and memorization. The following examples of resistance were identified in the experiment conducted during the summer of 1975. (These resistances all faded away after the staff had additional experience with the scorecard program.)

-- "Name," "describe," "cite," and "list" are all activities related to the regurgitation of facts. Thus, behavioral objectives do not allow for problem-solving and appreciation types of activities; behavioral objectives are too limited for our needs.

-- The scorecard requires that we specify ahead of time too much detail about the educational program. This will kill the spontaneity of our program.

-- The scorecard approach is too structured. It is too much like school and the kids and staff both want to get away from the school type of approach.

Many of these objections cannot be dealt with directly by words of encouragement from the EA coordinator. Most staff will simply have to wait to experience how a scorecard program works before they will become "believers." There are two things which an EA coordinator can do, however, to meet some of this initial criticism. First is to cite success of the scorecard approach in the four experimental camps of the summer of 1975. Second is to direct the staff to the sample scorecards developed in the summer of 1975 (pages 71-78); they illustrate the variety of EA activities which can be incorporated into a scorecard. There are even a few examples of "appreciation" objectives and skill development objectives (e.g., photography).

Enrollee involvement. In some camps the question will be raised about involving enrollees in the writing of behavioral objectives. It may be impractical to involve enrollees in this activity. There are several things to recommend against it. Enrollees usually are unfamiliar with the territory and with the types of activities in which they will be engaged for the summer. Enrollees are also unlikely to have the skills to specify their own educational program, especially in an area as new as environmental awareness. Finally, time is too short in a four to eight week program to expect that great chunks of time can be devoted to having enrollees think through what it is they want to or should learn. However, we are committed to the general principle of enrollee involvement wherever it is reasonable. Thus, we could see value in having campers do something like the following. A sub-group of enrollees might be asked to write the educational objectives for the very last work project of the season. If the particular project was well specified, it would be a learning activity for the enrollees to figure out what it is they could learn from the activity. For example, what are the possible ecological learnings to be gotten from transplanting marsh grass, live-trapping and moving a beaver family, building a trail-side rest area, or restocking a small brook? A second way in which enrollees might be involved would entail their critiquing at the end of the season the set of objectives which were followed for that season. Many enrollees may have suggestions for improving the objectives for a coming season. In the process of carrying out the critique, enrollees would have a chance to synthesize and summarize their own learnings of the summer.

WHAT THE CORE OBJECTIVES SHOULD SAY

Most of the scorecards which were developed in the summer of 1975 included only objectives for the "core" EA program. They were considered core because it was expected that all the enrollees would achieve them. In one camp, a set of optional objectives was specified in addition to the core; an enrollee could choose to fulfill any or none of the optional objectives. In addition to objectives which describe environmental learning outcomes, it is quite possible for a section of the scorecard to be set aside for personal objectives. This could include objectives such as learning how to use tools, survive in the wilderness, prepare for a camping trip, handle a canoe, etc. Those objectives not part of the EA program could be required of all enrollees, or could be optional.

In keeping with the general philosophy of the YCC program, the core objectives should be those which are achievable by all enrollees. This means that the final set of objectives for the camp should be a set which the staff thinks can be reached by all of the enrollees by the end of the session. If this indeed happens, then all enrollees will be insured of having a success experience in YCC.

This is not a trivial point. Whether by design or default, most public school instruction is characterized by spreading out students on a continuum of achievement, so that students are always aware of their ability in a particular subject relative to classmates. If the objectives in the scorecard are indeed achievable by all, then the YCC education program will be different from what the enrollees experience during the school year and indeed be evaluated by them as a superior educational experience. Based on the 1975 experiment, a set of objectives which are achievable by all enrollees will still represent a very impressive program (see the sample scorecards, pages 71-78). This is partly true because so much more can be learned in the outdoor action-oriented "classroom" of a YCC camp.

A guide to the content. The core objectives for each camp's program will be similar to those of other camps and yet quite different. They will be similar in that all camps should follow the guidelines of the EA Goals and Objectives, pages 4-7. However, the guidelines are just that: a listing of topic areas which each camp should cover in its own unique way. The specific behavioral objectives take into account the unique resources available in each camp.

As noted in the previous section, a common image of the nature of the behavioral objectives is that they cover only "regurgitative" types of activities. Thus, people tend to think that behavioral objectives are only of the following form:

Example 1:	Identify 20 species of plants in the camp area.
Example 2:	List four characteristics of each soil found from lake edge to upland meadow.

Such objectives test for mastery of facts and indeed may be a necessary part of any environmental awareness program. However, many people are concerned that this is the only type of behavioral objective that exists, and since they do not want their program to be a "memorizing the facts" type of program, they reject behavioral objectives out of hand. It is our experience that two things are involved. One, the staff needs to realize that other types of objectives that involve integration, problem solving, and affective outcomes are indeed possible. Two, once this realization is made, a staff will usually recognize that there is a certain knowledge base that is required before students can work at the problem-solving level. A helpful experience for a staff to have is to conduct a problem-solving activity such as, "How could the land here be used differently in a way which would ecologically be more sound?" Intelligent discussions on topics such as these require the acquisition of some basic facts about soil compaction, waste decomposition, and other related topics before reasonable suggestions can be made about sound ecological use.

Many examples of imaginative types of behavioral objectives can be found by looking at the sample scorecards, (pages 71-78); a few illustrations will be considered here. Objectives can be written which specify the major outcomes associated with an activity. For example:

Example 3: Perform a water analysis using the Hach water analysis kit. Do readings on dissolved oxygen, pH, and temperature. List three ways in which man can affect each of the above elements in water.

This objective specifies an activity which all enrollees are to carry out. It also makes it quite clear to both staff and enrollees alike that there is no expectation that an enrollee should become a water scientist. There are only three readings which will be required of an enrollee, thus it is clear from the beginning that the expectations are quite reasonable for any teenager to achieve. The final part of the objective, asking for ways in which man can affect water, is the type of objective which results from a staff investigating the purpose of an activity such as water analysis. It is clear for all to see that a water analysis is to be carried out because it teaches something about man and his relationship to the environment.

A fourth example shows how a behavioral objective can incorporate problem solving.

Example 4: Identify, analyze and propose at least two alternate plans of management for each of your work projects.

This objective requires a high level of creative thinking and problem solving to be successfully completed. It is also quite clear that the objective would meet an overall goal of the EA program: getting teenagers to appreciate the impact which man has had and can have on the environment.

A final example is presented which attempts to get at the emotional side of environmental awareness. By the admission of its creator the wording is not perfect; however, it is an attempt to make explicit the feeling side of the EA goals.

> Example 5: On a nature hike show a recognition (using all your senses) of the presence of natural phenomena of which you were formerly unaware. The goal is not to be able to name the many features of the environment; rather to simply recognize the existence of the not-so-obvious workings of the environment. Examples: (a) walking barefoot on a bog, recognizing that there are many different-feeling plants underfoot and that the bog itself feels different from solid ground; (b) hear that there are many different noises in the woods; (c) notice different smells in the woods.

The last example is presented to encourage camp staffs to push the limits of behavioral objectives to get at some of the very elusive and hard-to-express goals which the staff may have for enrollees.

On the next page is shown a list of verbs which were used in the 1975 experiment. These were culled from the four scorecards which were developed during this experiment. They are divided into five different categories to illustrate the different "levels" which an objective can have, depending on the type of outcome which is being specified. The lowest level verbs describe a behavior in which the learner demonstrates merely that he or she has acquired a certain amount of information. The second level is higher in that the learner is asked to do some synthesizing or problem-solving using facts. While the higher level is frequently looked on as being more desirable, most of the higher-level types of activities require the mastery of information as a prior step. Another type of behavior specifies that an activity is to be carried out such as collecting something or performing some packaged analysis such as a soil or water analysis. The implication here is that various types of learning are required for the activity to be carried out successfully, but not all of them are specified. Thus, to perform a soil analysis requires elementary laboratory skills and basic scientific investigation skills. The final category of objectives are those which concern affective or emotional outcomes. These are the ones that are most difficult to specify but which it is felt the staff should spend a lot of effort trying to develop.

It is felt that many staff involved in YCC bring to their job an almost religious zeal in their concern for ecological issues. They might feel a deep love and respect for the non-human elements in the ecosystem, or a sense of indignation over man's abuse of the natural resources. Their hope is that enrollees will come away from their YCC experience with a similar emotional intensity. But they perform a disservice for themselves and the enrollees if they do not think through

TYPES OF BEHAVIORAL OBJECTIVES USED IN YCC SCORECARD EXPERIMENT, SUMMER 1975

(Numbers in parentheses are the number of objectives of this type in the four experimental camps)

THINKING/REASONING BEHAVIORS

(99) 1. *Lowest level, demonstrating acquisition of information:* identify (21), describe (37), define (15), recite (13), name or indicate (5), list (8).

(44) 2a. *Higher level, requiring some synthesis or problem-solving:* analyze (4), explain (9), compare (2), propose and defend a solution to a problem (4), discuss (4), share views (1), correlate (1), predict (2), estimate (1), interpret (1), plan an activity (1), relate (1), cite an example (13).

(6) 2b. *Higher level, requiring some synthesis or problem-solving AND resulting in a visible product:* develop a dichotomous key (1), write an essay (2), take and record readings (1), add information to a chart (1), record results (1).

ACTIVITIES

(28) 3. *These have a thinking component but the emphasis is on the action:* collect (5), locate (2), do a soil or water analysis (4), conduct a visual examination (1), live-trap beaver (1), construct (a stream sampling screen, nesting box, etc.) (4), take pictures (1), set compass bearings (1), send a water sample to state lab requesting an analysis (1), view films (1), attend seminar (1), measure the site index of a northern hardwood (1), spend time in an activity (1), make bread or grind flour (1), measure (3), lead a seminar.

AFFECTIVE OR EMOTIONAL

(5) 4. work cooperatively (1), show a recognition of the presence of natural phenomena (1), analyze your life style (2), communicate your feelings (1).

(It is not necessary that a camp have specific affective objectives. It is reasonable to assume that attitude formation comes indirectly as a result of participating in all the other activities.)

carefully the specific enrollee outcomes which they hope for. Most adults acquire feelings such as these over long periods of time. A lifelong love for nonhuman creatures may begin with one single observation by an enrollee that human territorial expansion is depriving some creatures of their natural habitat. The future leader of an urban ecology club may begin developing her concern for the earth's non-renewable resources by having to look up and recite some facts about annual oil consumption and the stimated reserves available for future generations. Eight weeks is too short to "convert" youth, but it is ample time to teach some facts and skills, and to expose the enrollee to new experiences and viewpoints.

USING THE ENVIRONMENTAL AWARENESS GOALS AND OBJECTIVES

The camp staff responsible for the scorecard should begin their job by reading the Environmental Awareness Goals and Objectives. In the course of reading these, several things will come to mind. One, the guidelines will suggest specific behavioral objectives which are not related to work projects. Two, they will suggest certain types of projects which are particularly suitable to illustrating some specific guidelines. As the project is analyzed for its specific educational components, it will frequently occur that objectives are suggested which go beyond the guidelines, but which will become part of a camp's program because they are appropriate learnings within the overall goals of the EA program.

An easy way to begin involving an entire camp staff in the generation of behavioral objectives is to have them analyze the summer's work projects for their educational components. This provides some initial structure for the activity, and it also will start the staff thinking about ways in which the work might be carried out to best exploit the educational potential.

Camps may find it useful to organize their entire scorecard around the work projects. This has the advantage that the scorecard can serve not only as an educational guide, but also as an organizing tool for the work program. An example of this type of organization is illustrated in the scorecard from Seney Wildlife Refuge (pages 71-72). Recreation activities can be included as well, if they have a specific educational component.

A CHART TO MATCH EACH CAMP'S OBJECTIVES WITH THE NATIONAL GUIDELINES

To help assess the degree to which a camp's scorecard of objectives meets the guidelines set down by Washington for EA programs, it is suggested that something be added to the scorecard program which was not part of the 1975 experiment. On the next page is a simple chart that is used as a basis for program planning. The rows are the National goals and objectives, while column 4 is the basis for the scorecard. An EA coordinator would check off for each objective the guidelines which the objective was designed to meet. An example of such a chart is shown below. Note that by looking at column 4, the EA coordinator can see immediately if there are behavioral objectives written for each of the major guideline areas in the EA program. This is the criterion which both the EA coordinator and the Region (or Washington) could use to assess the adequacy of the camp program. This chart along with the actual scorecard should be sufficient to assess whether the guidelines were properly implemented in the work program in each and every camp throughout the country. (Achievement of the objectives in the scorecard is discussed later.)

Example of a form which each camp would report the
match between their behavioral objectives and
the broader goals and objectives stated in the
National guidelines

MATCHING THE NATIONAL GOALS & OBJECTIVES WITH THE WORK PROGRAM & THE CAMP SCORECARD

Instructions: Enter the work project(s) that will best meet each National objective in column 2. Fill in columns 3 and 4 appropriately.

National Goals/ Objectives (1)	Work Project (2)	Describe activities to be used in accomplishing objective (3)	Describe how you will tell when accomplished (Behavioral Object (4)
1.1			
1.2			
1.3			
1.4			
1.5			
2.1			
2.2			

INDIVIDUAL ENROLLEE SCORECARDS

The set of educational objectives should be entered into a scorecard which can be printed or duplicated and distributed to everyone in camp. The scorecard consists of (1) a place for the camper's name, (2) a listing of the objectives and (3) a place provided next to each objective for a staff person to enter his initials and the date when the objective was accomplished. Each enrollee and each staff person need to have a copy of the scorecard. Since the final list of objectives may be decided upon only days before the beginning of camp, a local printer should be enlisted well in advance to provide rapid turnaround.

In the 1975 experiment, there were two certification columns on the scorecard. One column was used for certifying the achievement of an objective during camp, the other for certifying the achievement of an objective prior to the beginning of the camp's educational program. While this "double checking" is desirable from a theoretical standpoint of evaluating how much the camp education program teaches, it is impractical. In subsequent years, it seems reasonable to include only the one column which certifies achievement of objectives during the camp season.

INTRODUCING THE SCORECARD TO ENROLLEES

A camp staff has some latitude concerning when the actual scorecard is introduced to enrollees. Some camps report that at the very beginning of the camp season anything such as a test or scorecard is seen as a negative aspect of YCC. Teenagers come to camp tired of school, and reject any reminders of the long school year behind them. In such a situation it seems quite reasonable to hold off the introduction of the actual scorecard for as much as one week (in an eight-week program) into the season. Such a delay can be helpful only if the following strategy is followed: The camp staff operates the education program as it is specified in the scorecard. The only difference is that the enrollees are not told that a definite educational program is being followed. When the scorecard is introduced, it is pointed out to enrollees that at this point in time they have already achieved a large number of the objectives that the staff had set for the EA program. In this way, slow learners and those who are apt to feel most negative about a school-like education program will receive a boost when they realize that in the course of a very short time they have already achieved a large number of objectives.

At the time the scorecard is presented to the camp it is important that the staff be fully in support of the scorecard. Enrollees will sense if this is not the case. If the staff see the scorecard as helpful and convey this to the enrollees, they will respond accordingly.

SCORING PROCEDURES

Certification of the achievement of objectives should be the responsibility of the staff. In some camps it may be felt that only the EAC should be allowed to initial the achievment of an objective. However, this may unduly restrictive, and present an unneeded burden on a single staff person. The key factor to be considered is that whatever group of staff is responsible for certification, they should all share the same criterion for what represents "achievement" of any one objective. Enrollees should not sense that one staff person is "easy" and another staff person "hard." What exactly is required for achievment of any one objective is not always easily specified. Objectives that require listing, citing, or defining are easy to judge because the criteria are commonly held by all. However, other objectives require the judgment of the certifier. These objectives should be discussed in detail among the staff. The most important thing is consistency and making sure that the requirements are adequate to the intent of the behavioral objective. The system can be easily manipulated to make a camp "look good," but such manipulation will not be helpful to other enrollees or the staff in terms of having a quality environmental awareness program.

An issue to be discussed among the staff relates to how many enrollees can be certified at any one time. Some objectives state clearly that an enrollee is to do a particular activity and report on the results of the activity performed. For example, doing a soil analysis requires that each enrollee take a sample of soil and identify a specified number of components of that soil. Presumably, each enrollee must be certified separately as to the achievement of such an objective. Other objectives require the enrollee to perform activities such as to discuss, propose a solution to a problem, compare two uses of land, or other activities which might reasonably be carried on in a group setting.

The question is whether the staff will allow mere participation in a discussion to result in the certification of all people who belong to the discussion group. There is no simple answer to this question. The staff must decide separately for each objective, taking into consideration the educational goals which they have for the enrollees. If the goal for the particular objective is to have each enrollee take home a specific skill, then it is probably necessary to separately certify each enrollee on the attainment of that objective. If the educational goal is to merely expose enrollees to some new ideas, concepts, or activities, then certifying all who participate in the activity--regardless of the extent of their participation--is probably an acceptable practice.

During staff training week, after the scorecard content has been finalized, the staff should be led in a discussion of the norms for certification, and asked which, if any, of the objectives the staff thinks could be approved in a group setting. Since the answer is not easy for anyone to make in the abstract prior to teaching enrollees in the field, this same discussion should be repeated after the first week or two of camp.

MASTER SCORECARD

A master scorecard can be kept on which the progress of each enrollee is charted. If this master scorecard is updated once a week or more frequently, the EA coordinator can see at a glance whether or not there are particular enrollees or particular work groups which are falling behind the planned progress of the program. Thus, the master scorecard can tell an EA coordinator where to place a corrective prod.

In the experimental year, it was recommended that a master scorecard be posted publicly in camp so that enrollees and staff could keep track of progress. In three of the four camps, it was decided by the staff that they would not post the scorecard publicly. The rationale was that such a posting would engender unhealthy competition among the enrollees. Others feel that the public posting of a scorecard does not necessarily instill unhealthy competition. However, it is not obvious that public posting has any intrinsic advantages; accordingly, it should not be done unless the camp staff feels it will help their program.

MASTER SCORECARD SUMMARY FORM

During camp, the master scorecard can provide continuous diagnostic information on the progress of the educational program. At the end of camp it can supply information on the overall success of the program. This diagnostic information comes from summarizing the master scorecard results. Each objective should be scored by tallying the number of enrollees who achieve the objective and dividing by the total number of enrollees. This figure answers the question, "What percentage of the enrollees achieved objective X?" These numbers might be transferred to an individual scorecard; the scorecard can then be scanned to identify objectives where the achievement level is below what was hoped for.

This diagnostic exercise is very important. A staff writes a collection of behavioral objectives, hoping that they will all be achieved by all enrollees. The staff ought to be interested in whether or not their goal was achieved in the course of the summer. Falling short of the goal should result in revision of the program for the coming year; perhaps certain objectives should be dropped which are seen in retrospect as being too time consuming. The achievement of an objective by only a small portion of enrollees may suggest that it is too difficult to be a part of the "core." One hundred percent achievement of all objectives might be an indicator of a perfect program, or it might lead the staff to raise the question of whether the program in a subsequent year might not be expanded to include even more objectives.

Whatever the conclusion, the point is that a master scorecard requires very little work to maintain and yet can provide a lot of information which is helpful in revising an EA program to make the best possible program for youth. The conclusions reached by the staff should be committed to writing at the time the diagnosis is made. Any notes for the revision of the scorecard should be included in this document and kept by the Program Manager in case there are key personnel changes the following summer.

Another purpose of the master scorecard summary is to provide some information to those outside the individual camps who are responsible for the overall program. While it is recognized that the scorecard is not a perfect evaluation tool in terms of it being an objective measure of what it is that YCC enrollees learn, the mere list of objectives gives some indication of the quality of each camp's EA program. People at various levels might be interested in this information.

First are the regional or bureau people who feel a direct line responsibility for the performance of these camps. The scorecard is a good discussion tool for camp staff to convey to these people both the content and relative success of the environmental awareness program. The fact that it can be "scored" at camp means that the summary data are ready for use within a few days of the end of camp. A second group that may be interested in the scorecard results are at the Washington level. Those responsible for program evaluation can use the results in compiling the annual program report. Each scorecard is an example of the kinds of things that are being taught in the field and may indeed be more impressive to Congressmen and others concerned with the continuation of the YCC program than any objective test of environmental knowledge. Finally, the "matching" document and the summary data on completion of objectives provide helpful information for those in program planning and support. These provide key data for revision of materials and the curriculum for spring training of camp staff.

SENEY TEACHING OBJECTIVES BEFORE TRAINING

1. Familiarize students with killing invertebrates for a comparative study involving kinds and number.
2. Encourage awareness that populations of animals differ in different invertebrates.
3. Ability to classify invertebrates.
4. Give experience in a technique of analyzing soil types.
5. Demonstrate that soil is made up of several components.
6. Create an awareness that soils differ in different locations.
7. To expose students to the conditions of a relatively undisturbed natural area.
8. To familiarize students with handling a measuring device and collecting data from it.
9. To demonstrate that soil temperatures vary under different environmental conditions.
10. To understand man's dependence on his environment.

11. The effect of man on his environment.

12. Impact of man on his environment.

13. Familiarize students with man's attempt to aid in reproduction of aquatic life.

14. Encourage students to identify species.

15. Realization of a kind of pattern to be found among various water sources.

16. Attempt to draw correlations between elevation of temperature, composition of stream bottom and organism types.

17. Understand stream patterns.

18. Understand that similarity among natural communities is a result of the similarity among interacting variables.

19. Ability to map stream height, etc.

20. Identify aquatic life in stream.

21. Examining habitat of beaver.

22. Examining beaver dam construction.

23. Examining beaver hut vegetation.

24. Examining surrounding terrain.

25. Examining aquatic terrain.

26. Understand the growth of pond vegetation.

27. Being able to classify aquatic vegetation.

28. Understand development of G.T.

29. Understand receding water.

30. Understand development of dunes coastline.

DISTINGUISHING TEACHING OBJECTIVES FROM STUDENT BEHAVIORAL OBJECTIVES

TEACHING OBJECTIVES	EQUIVALENT STUDENT BEHAVIORAL OBJECTIVES
Topic: Soil study	
1. Give experience in a technique of analyzing soil types.	1. Using a soil sample kit: a. Correctly draw a sample of soil b. Identify the pH, Nitrogen, Phosphorous and Potassium levels in the sample.
2. Demonstrate that soil is made up of several components.	2. Define and distinguish among sand, silt, clay, humus. 3. As a part of a sedimentation study, determine the fractions of each soil type.
3. Create an awareness that soils differ in different locations.	4. Correlate flora with soil type, identifying two species that correlate to each part of the pH range. 5. Explain what indicator species tell you about soil pH in an area.
Topic: Invertebrates in wildlife areas	
4. Familiarize students with killing invertebrates for a comparative study involving kinds and number.	6. On visits to four different areas: a. Collect invertebrates in a "kill" jar. b. Identify the characteristics of each invertebrate (body, legs, wings, and other obvious external features).
5. Give students ability to classify invertebrates.	7. Develop a dichotomous key for the invertebrates.
6. Encourage awareness that populations of animals differ in different invertebrates.	8. Describe ways in which the invertebrates of each area are the same or different and give reasons for the difference.

Date and Staff Initials

22. Collect and identify aquatic life from the river bottom and plant life from the adjacent river bank. ________

23. Using the range pole measuring device, determine the slope of several sections of the river. Add your findings to the profile. ________

FISH HATCHERY

24. Participate in the field trip to the fish hatchery. ________

WATER FOWL TRAPPING

25. Observe and participate in the herding, banding, and examination (blood sampling and sexing) of geese in the Refuge. ________

BEAVER STUDY

26. Within the Refuge, identify two areas which beavers would likely choose as their habitat based on vegetation and stream size. ________

27. Live-trap beaver in a given area and dismantle the dam and hut in the area. Be able to describe the structure and strength of the dam and hut. Give pros and cons of live trapping (man, beaver, sustained yield principles). ________

28. Identify at least 5 ways in which the presence of beavers and their buildings impacts on the surrounding area. ________

29. Based on all you have learned, suggest two possible relocation areas for the live-trapped beaver. Defend your choice, considering the impact on the environment (land and other animals). ________

NESTING BOXES

30. Observe and particpate in the checking of nesting boxes. Record your findings on the charts provided. ________

Camper's Name DATE And STAff INITIALS

ENVIRONMENTAL LEARNINGS SCORECARD
SENEY YCC -- SUMMER 1975

SOILS

1. Using a soil sample kit:
   a. Correctly draw a sample of soil
   b. Identify the pH, Nitrogen, Phosphorous, and Potassium levels in the sample.

2. Correlate flora and soil type, indentifying two species that correspond to each part of the pH range.

3. Explain what indicator species tell you about soil pH in the area.

4. Define succession.

5. Define and distinguish among sand, silt, clay and humus.

6. As a part of a sedimentation study, determine the fractions of each soil type.

INVERTEBRATES IN WILDLIFE AREAS

7. On visits to four different areas:
   a. Collect invertebrates in a "kill" jar
   b. Identify the characteristics of each invertebrate (body, legs, wings, and other obvious external features)

8. Develop a dichotomous key for the invertebrates.

9. Describe ways in which the invertebrates of each area are the same or different, and give reasons for the difference.

DRIGGS RIVER VISIT

10. a. Using a compass, determine the location of N, E, S, W.
    b. Using the sun and physical features, get to the Driggs River from your starting point.

Date and Staff Initials

AQUATIC VEGETATION TRANSECT

31. Plan and carry out an aquatic vegetation transect.
    a. Correctly set compass bearings
    b. Identify with the aid of handbooks, herbarium, and instructor guidance all of the collected vegetation. ________

32. Identify without any assistance the dominant aquatic species in the Refuge (e.g., bullrush, cat-tail, American Lotus, etc.). ________

33. Construct a graph showing plant occurrence, plant density, and water depth, and likely bird species in the plan area. Graph must be of high enough quality to be entered into permanent files of the Refuge. ________

WATER STUDY

34. Using the Lamotte Water Testing Kit:
    a. Correctly identify which area of a pond or stream need to be sampled.
    b. From each sample, identify the levels of pH, Nitrates, Phospahtes, Silica, Calcium, Magnesium, hardness of the water, CO_2, and temperature.
    c. Using your pocketbook (pp. 52-60), predict what aquatic life you would expect to find based on the pH and temperature. ________

35. Send part of one of your samples to the State Testing Laboratory. Compare their analysis with yours. Explain what a coliform count is and what it is used for. Explain public preference for hard/soft water and for water with low iron content. ________

SUMMARY

36. At the end of camp write a description of the major goals of the Seney Refuge in the management of land and water for wildlife and in increasing public awareness. Explain how each of your work projects fits into one of these goals. ________

Date and Staff Initials

11. Select features of the area that the group agrees would be of interest to the public on a nature trip. Defend your choice. ________

12. Participate in a group discussion of the environmental impact of having a nature trail in the area. ________

BIRD STUDY

13. Identify the size, coloration and at least one distinctive feature (e.g., song, habitat)of each bird on the special version of the listing "Birds of Seney Wildlife Refuge." (approximately 25 species) ________

14. Using the Field Guide to the Birds, locate the pictures of two birds in the Refuge, not including common birds such as the robin, blue jay, etc. ________

VISIT TO GRAND MARAIS DUNES

15. Describe in your own words the origin of the Grand Marais Dunes. ________

16. Locate a poison ivy plant. ________

17. Describe in your own words the following things about the Lamprey Eel.
    a. How they invaded the Great Lakes ________
    b. Their effect on the fish on the Great Lakes
    c. How man is controlling the Lamprey

STREAM PROFILES

18. Construct a "stream sampling screen" and a "range pole measuring device." ________

19. Conduct a visual examination of the stream bottom and draw a profile of the distribution of materials there. ________

20. Using the screen, collect material and debris from each section of the river bottom and record the results on the profile. ________

21. Take temperature readings of each of the main areas of the river bottom. Add data to the profile. ________

Date and Staff Initials

3. Learn the common names of a variety of reptiles and amphibians found in the Sprinkler Lake area. You may detain for camp interest specimens caught in a make-shift "terrarium" designed only for temporary lodging. Add names of reptiles and amphibians to the camp list. ________

4. Through selected readings share your findings by participating in or leading a "seminar" on one of the environmentally related areas such as: population, food-hunger, energy crisis, safety of nuclear power plants, land use, sewage treatment and use, solid waste disposal, extinct species, air pollution, thermal pollution, agricultural pollution, pesticides and herbicides, edible plants, particular habitat and community (oceans, forests, bogs, deserts, lakes, grassland, etc.), or a topic of your choice. ________

5. Collect and prepare a snack of edible plants and invite your friends (e.g., invite your crew or a group of your choice). ________

6. Attend a seminar on introductory photography in order to take better pictures (John).

7. Take your own pictures and develop your slides in camp with the kit provided. Instruction and assistance will be provided (John). ________

8. Assist in developing a camp collection of slides to be shown to all campers (John). ________

9. Participate in a star and moon gazing tour in order to learn the names, legends and other phenomena observed (Roger). ________

10. You will learn behavior and survival patterns of a particular animal in this area. ________

11. Make a jar or bottle terrarium for display to take home. ________

12. Using an increment borer do a comparative study of trees in this area. ________

Camper's Name____

ENVIRONMENTAL LEARNINGS SCORECARD
SPRINKLER LAKE YCC -- SUMMER 1975

Introduction

Of several hundred YCC camps in the United States, Sprinkler Lake is among four camps selected from all YCC to use an experimental system of measuring the nature and extent of environmental education. Instead of the traditional method of a written test, this new system uses a list of learning objectives that can be accomplished by most campers as well as a list which are optional and suggested additional learning activities.

The idea of this method of measurement was born when the testing method proved unsuccessful in measuring the learning that goes on in YCC camps. Since the Congress of the United States funds YCC, it is necessary for them to know the quality and extent of the environmental education program. If this method of measurement proves successful, next year all YCC camps Nationwide will use this system, and the Congress hopefully will find our results worthy of an even larger YCC program.

Prior to the beginning of camp, the Sprinkler Lake staff working together, wrote objectives they hoped every camper could successfully complete. These objectives are not intended to be restrictive, consequently we urge your creativity and initiative to write and accomplish your own objectives to meet your interests and needs.

These objectives should be looked upon as providing direction for both staff and camper. Our hope is that these objectives help make learning exciting and interesting. As you participate in a variety of exciting and meaningful experiences this summer to meet these objectives, we are convinced that you will be a changed and enriched person as well as an instrument for change to meet the environmental needs of the Space Ship Earth.

CORE OBJECTIVES -- FOR ALL CAMPERS

Date and Staff Initials

1. FOOD
   a. Describe the basic elements of human nutrition. ________
   b. Discuss basic concepts of "protein complementing" in the preparation of complete foods from meatless ingredients. ________
   c. View the films, "Where Food Comes From," and "Diet for a Small Planet." ________

Date and
Staff Initials

13. Using the stream velocity gauge measure the velocity and stream flow along several points in a given stream and interpret the results. ________

14. Prepare a 2 page summary of timber harvesting and processing on the Huron National Forest. Include data on growth harvest and toal volume of timber. Present the finished paper to Mr. Newell. ________

15. List and describe the progression of changes in the sequence of events: Mature aspen forest in regeneration cut (a) 5 years after cutting, (b) 10 years after cutting, (c) 20 years after cutting, (d) 40 years after cutting. Include a discussion of kinds of ground plants and wildlife found in each period. ________

16. Measure the site index of a northern hardwood stand and estimate the volume of timber on the area measured. ________

Date and
Staff Initials

d. Grind grains for flour to make bread and aid in the preparation of camp meals. ________

e. Spend 10 minutes per day in the camp garden, either weeding, transplanting, fertilizing, picking insects, mulching, etc. If you cannot bring yourself to work with the plants, then spend time sitting beside the garden thinking good thoughts. ________

f. Be responsible for own food waste by practicing in dining hall sorting the waste from meals. Read how each type of waste is disposed of. Waste types: glass, cans, organic, paper plastic. ________

g. Participate in the composting process, helping to make a finished compost pile. Wate pile grow, noting which materials are necessary and in what order they are added. ________

2. WATER

a. Explain the stages of succession a lake undergoes, using Sprinkler Lake as an example. ________

b. Given a map of the Sprinkler Lake Area, identify its watershed and drainage pattern. ________

c. Compare the plant and animal life of a lake with that of a stream and mention factors which explain how they differ. ________

d. Explain why it is important to use both biological and chemical criteria in determining water quality. ________

e. Determine the water quality of Sprinkler Lake using the Hach Testing Kit. ________

Date and Staff Initials

4. Community. Define, recite, cite. ________

5. Niche. Define, recite, cite. ________

6. Habitat. Define, recite, cite. ________

7. Patterns. Define, recite, cite. ________

8. Carrying Capacity, Define, recite, cite. ________

9. Cycles. Define, recite, cite. ________

10. Succession. Define, recite, cite. ________

11. Adaptation. Define, recite, cite. ________

12. Energy Flow. Define, recite, cite. ________

13. Evolution. Define, recite, cite. ________

Camper's Name____

ENVIRONMENTAL LEARNINGS SCORECARD
MT. RAINIER YCC -- SUMMER 1975

UNDERSTANDING KEY TERMS

Define term in your own words to the satisfaction of staff.
Recite the "key phrase" for the term.
Cite one example of the term from each of four environments: (i) natural environment inside Park; (ii) natural environment outside Park; (iii) urban physical environment; (iv) human social environment.

Date and Staff Initials

1. INTERDEPENDENCE
   - a. Define term and recite "key phrase." ________
   - b. Using 3 examples, describe the relationship between man and trees or animals. ________
   - c. Using 3 examples, describe the relationship between YCC enrollees and Park Service employees. ________
   - d. Describe at least 3 ways in which the natural environment and Washington State's economy are interrelated and interdependent. ________
   - e. Describe at least 3 ways in which a lumber mill is related to a supermarket. ________
   - f. Describe at least 3 ways in which Rainier, the mountain, is interrelated with the surrounding natural and man-made environments. ________
   - g. Describe 3 ways in which Mt. Rainier National Park is interrelated with the natural and man-made environment outside the Park. ________

Date and Staff Initials

2. DIVERSITY
   - a. Define term and recite "key phrase." ________
   - b. Develop a dichotomous key for leaves from 10 different trees. ________
   - c. Describe a large urban environment in terms of the types of diversity found there (living patterns, people, work environment, businesses, functional areas such as living and working, etc. ________
   - d. Choose 3 different cities which have different images or character and describe what the image or character is. ________
   - e. People often have a wide variety of feelings related to single experience. Describe five feelings which you experienced during a recent work project. ________
   - f. Describe 3 different human needs that are met by the Mountain (Rainier). ________

3. CHANGE
   - a. Define term and recite "key phrase." ________
   - b. List 5 changes that have taken place at a recent work project site (both physical and ecological changes). ________
   - c. Describe 5 changes that have taken place in you since you arrived at YCC ________
   - d. Using 5 words for each, describe Longmire 100 years ago, today, and 100 years in the future. ________
   - e. Describe 5 ways in which water in its many forms is causing changes on Mt. Rainier. ________

Date and Staff Initials

24. Analyze your life style (pattern of recreation, consumption, transportation, shelter, job) with respect to the following: (a) its impact on other people, (b) whether resources involved are renewable or non-renewable, (c) whether or not the products are biodegradable, (d) whether activity is based on need or want, (e) whether activity shows concern for present or future, (f) whether activity shows concern for forms of life other than man. ________

25. Participate in the planning and carrying out of the following activities: (a) overnight backpacking (edible foods, etc.), (b) day hiking (map reading, rock scrambling, etc.), (c) river canoeing. ________

26. On the above activities work cooperatively to achieve the objectives of the activities. ________

27. Demonstrate in your own decision-making an awareness that every action has more than one impact; that the action makes "ripples" throughout the ecosystem. ________

28. On a nature hike show a recognition (using all your senses) of the presence of natural phenomena of which you were formerly unaware. The goal is not to be able to name the many features of the environment; rather to simply recognize the existence of the not-so-obvious workings of the environment. Examples: (a) walking barefoot on a bog, recognizing that there are many different feeling plants underfoot and that the bog itself feels different from solid ground. (b) Hear that there are many different noises in the woods. (c) Notice different smells in the woods. ________

29. In 5 years, given a decision that will have an impact on the environment, choose the alternative that shows the greatest respect for the delicate nature of the environment. ________

Camper's Name ______________________________

ENVIRONMENTAL LEARNINGS SCORECARD
CLEAR LAKE YCC -- SUMMER 1975

Date and Staff Initials

1. Do a soil analysis using the Lamotte soil sample kit and correctly identify the soil texture, structure, pH, temperature, and color. ________

2. List ways in which man can affect each of the above elements of the soil. ________

3. Describe the differences between sand, silt, and clay. ________

4. Describe a plant community associated with common soil types in this area. ________

5. Name three anaimals associated with each of the above plant communities. ________

6. Describe the role of each of these elements in the hydrology cycle: evaporation, transpiration, rainfall, runoff, and ground water. ________

7. Describe the non-technical terms how plants make energy and oxygen as a by-product. ________

8. Cite 3 climatic factors which affect plant growth. ________

9. Cite 3 ways in which man alters forest and wetland ecosystems. ________

10. Describe at least 3 ways in which there is interaction among soil types, plant communities, and animals. ________

11. Correctly perform a water analysis using the Hach Water Analysis Kit. Do readings on dissolved oxygen, Ph, and temperature. ________

12. List 3 ways in which man can affect each of the above elements in water. ________

SAMPLE SCORECARD - REDUCED SIZE FOR EASY CARRYING

To achieve this size scorecard:

1. Type original of scorecard on legal size paper (8½" x 13").
2. Instruct local printer:
    a. Photo reduce each page of the original to 65% of its size. This will result in a new copy of each page that is approximately 5½" x 8½".
    b. Paste these onto new sheets 8½" x 11" following layout of this sample scorecard.
    c. Print the result back to back. Produce enough copies to have enough for everyone in camp plus a sizable number of extras.

Date and Staff Initials

13. Construct a food chain from producers through consumers using plants and anaimals from this area. Note the numbers in each group relative to the adjacent group on the chain. ______

14. Describe the flow of energy from the sun through the food chain. ______

15. Given several plant or animal populations, identify 3 factors which could limit the number of individuals in that population. ______

16. Indicate what evidence would indicate that there was too large an animal population on a plant community. ______

17. Given three areas in different stages of succession, identify which stage each area is in and support your decision. ______

18. Relate how productivity varies in each stage from pioneer to intermediate to climax. ______

19. Indicate ways in which man can influence plant success. ______

20. After study visits to the following, communicate your attitudes and feelings about man's effect on ecocystems in this area. (a) sanitary land fill, (b) solid waste disposal, (c) an industrial site, (d) recreational areas, (e) forest management areas, (f) residential areas around a lake. ______

21. Outline the Forest Service philosophy of multiple land use. ______

22. Identify, analyze, and propose at least two alternate plans of management for each of your work projects that has a management dimenison to it. ______

23. At the end of the summer participate in a discussion which attempts to identify ecological problems that exist in your home setting and suggest possible solutions to some of them. ______

CHAPTER 6 - URBAN YOUTH AND THE YOUTH CONSERVATION CORPS

by Margaret Rosenberry

The ideas and suggestions made here by Margaret Rosenberry also have application to non-urban YCC camps.

Working with urban young people often poses more problems than working with young people from other environments. They are more "street wise" and exposed to more crime, drugs, and pollution than most rural young people. It is, however, important that they be a part of YCC. The only alternative to increasing population will be urban centers where large numbers of people can live close together in a pleasant environment. To accomplish this, we need to develop a core of motivated people with a positive attitude toward urban living who will work toward a better city environment. The YCC can be a step in this direction for some youth if it is relevant to their environment. It must be a means of improving their city by providing more facilities and cleaning and maintaining existing ones. It must create understandings of ecological principles in terms of an urban setting. It must present the city in a positive light. Evidence of man's misuse of his environment should not be discussed unless possible solutions are also offered. The young people involved in YCC should develop some understandings of how to solve these problems and should be left with the feeling that they can do something about the environment problems of the city.

Many urban young people have also not developed a good work ethic or a positive attitude toward learning. As a result, many YCC camps experience difficulty working with their urban young people. Most people working with them in YCC do not share their background and have a difficult time relating to them and dealing with them. YCC can help them develop a healthy self image and a sense of social responsibility. It allows some youth to be successful at something positive for the first time. The following suggestions include many which have been tried successfully and seem to work well for YCC programs. In many programs a hard line was taken at first, but the experience with YCC still seemed to be a positive one for most enrollees.

1. Delineate a clear cut set of rules of conduct and dress.

2. Provide a comprehensive orientation session so they understand the objectives of the YCC.

3. Make sure they know exactly what is expected of them. It is much easier to fulfill someone's expectations if those expectations

are clearly defined. It is also easier to back up punishment if expectations are clear-cut!

4. Make sure they understand they will be expected to put in a hard day's work.

5. Make sure they understand the reasons behind all safety regulations. This goes for all aspects of their experience. They must know the reasoning behind their tasks and projects.

6. If they come to work improperly dressed, send them home for the day and dock them that day's pay.

7. Enforce strictly the rules and regulations you have established.

8. Don't be afraid to fire or dock the pay of anyone who isn't doing his share. Usually one such occurrence shows the enrollees that you mean business.

9. Find work projects they can help plan and into which they can have input.

10. Find work projects in areas with a high degree of public visibility. The attention and praise they often receive from people who see them working helps create the pride in a job well done that increases their motivation and enthusiasm.

11. Plan for heterogeneous work crews. YCCer's should have the opportunity to work with and relate to others from different racial, social, and economic backgrounds.

12. Be positive. Young people will rise to your expectations if they are clearly defined. If you have low expectations of them they will also fulfill them. Challenge them and be lavish in praise for a job well done.

13. Listen to them, give them responsibility and show them you care about their ideas.

Peer pressure is very strong in teenagers. It can be used to your advantage in heterogeneous work crews. One of the strengths of the YCC program is that it is not limited to young people from lower-income levels. This allows youth from highly motivated backgrounds to work with youth from welfare or low-income backgrounds. Arrange your work crews so they reflect this span of background. Highly motivated young people have a positive effect on others and, at the same time, they can learn a great deal about urban life styles and the problems which result from many inner city environments.

The YCC has not been created as a therapy program for urban youth. Be sensitive to the special problems of urban young people, but do not expect or use the YCC to solve their problems. It can be a positive work experience for them and it can help them become useful, working citizens with a positive attitude toward their city, but any real change can only come with time. One summer with YCC is only a beginning.

Identification of City Work Projects

The following outline lists possible urban work projects. Add these to your own lists and adapt them to your own situation.

I. Vest Pocket Park Development - Locations

- A. Vacant lot parks
- B. Cemetery parks
- C. Specialized parks within parks
- D. Rooftop parks
- E. Greenbelt areas
- F. Old dumps, landfills
- G. Near municipal buildings (children's areas, game areas, etc.)
- H. Riverbanks
- I. Railroad rights-of-way
- J. Industrial waste areas
- K. Creation of small green spots in cities

II. Revegetation

- A. Tree and seedling planting
- B. Shrubbery and grass planting
- C. Flowerbed development
- D. Seed cultivation for future planting
- E. Maintenance and cultivation work in city greenhouses for public plantings

III. Plant Maintenance

- A. Thinning and tree maintenance in parks
- B. Pest control
- C. Pruning

IV. Landscaping on Public Lands

V. Public Park and Facilities Maintenance

  A. Erosion control
  B. Repair and painting of buildings, walkways
  C. Establishment of natural barriers for control of human pathways
  D. Stream and water way improvement
  E. Picnic table and park bench construction and repair
  F. Construction of new buildings or facilities
  G. Nature trail development (make sure nature trails interpret, not merely identify. A city nature trail could be set up along a major pedestrian thoroughfare interpreting city wildlife, or city life and it's relationship to the environment.)
  H. Bike path construction
  I. Basic clean-up, litter patrol
  J. Replanting
  K. Landscaping

VI. Waterway Improvement

  A. Stream cleanup
  B. Water quality analysis
  C. Erosion control
  D. Bank development for picnicking, walking, biking
  E. Identification of pollutors

VII. Surveys and Inventories: could be coordinated with other YCC programs for statewide inventory

  A. Air quality testing

    1. Testing for oxygen content, pollutants, etc.

    2. For use by environmental advocacy groups, city planners, air pollution control boards

  B. Water quality analysis
  C. Lead paint poisoning analysis
  D. Recreational needs inventory

    1. Lists of parks, swimming pools

    2. Location of parks, etc.

    3. Who do the parks serve?

    4. For use by city and recreational planning agencies

  E. Natural or unique areas inventory for environment

F. Noise pollution testing
G. City environmental quality survey

   1. Could be combined survey

   2. For use by local service groups for lectures, planning boards, etc.

H. Litter survey

   1. What makes up bulk of litter?

   2. Where is most litter?

   3. Write to newspapers about the survey or to companies whose products are most often found as litter.

   4. Could be used in anti-litter campaign.

I. Wildlife inventory

   1. What animals are found in the city?

   2. Where are they?

   3. How many?

   4. What do they eat?

   5. Suggestions for wildlife habitat improvement

J. Tree and plant inventory

   1. What trees grow and where?

   2. Which trees are healthy?

   3. Which trees need care?

   4. Which trees grow well in city?

   5. Are there any signs of pollution damage?

VIII. Municipal Buildings

A. Painting and upkeep
B. Replanting and selective planting for wildlife
C. Landscaping
D. Building Maintenance
E. Flower Planting

IX. Work in Zoos, Botanical Gardens

A. Animal care
B. Plant care
C. Building maintenance
D. Landscaping
E. Visitor Services
F. Nature trails
G. Develop community flower and vegetable gardens

These projects are only suggestions. Use your own ideas and those of your group. Make sure that any surveys or inventories they conduct for the city will be used. An air pollution survey will seem fruitless to the enrollees if they think the city council is not actively interested in improving the city air quality.

Some of your projects will be long term. Make sure uninteresting, mundane projects such as litter pickup are not. Enthusiasm for the projects as well as the educational possibilities within them decrease as the time on them increases. Remember: the enrollees are to receive a varied work experience which provides them with learning experiences in a variety of areas. Careful planning and attention to YCC philosophy will provide this for them and will also provide the city with a dedicated, enthusiastic work force.

Once the work projects have been selected an environmental awareness plan can be developed for each one. The first step is to develop motivation for work accomplishment among the enrollees. To accomplish this make sure they understand:

1. Why the project is important to the management of the environment.

2. How the project fits into the environment plan of the park of work area.

3. What skills, tools, and supplies are needed to do the job.

4. What difficulties may be encountered in doing the job. (safety hazard

5. How the project benefits the community.

6. What the environmental problems or benefits are.

Whatever, the project, the quality and quantity of the work accomplishment will improve if the crews know what they are doing and why they are doing it.

The second step is to establish a series of learning goals for each project. List all possible subjects that could be covered as the work is accomplished. Part of the educational process involves giving the enrollees the skills they need to complete their tasks. It is not necessary to cover all established goals, but listing them will make the crew chiefs and supervisors consciously aware of the educational opportunities inherent in the work projects. It is particularly important in urban projects to include environmental advocacy goals in the learning experience. The enrollees should be learning how their community handles environmental problems and the part they can play in solving them. They must feel that they really can make a difference.

SURVEYS AND INVENTORIES

The surveys and inventories suggested under urban work projects provide excellent opportunities for the enrollees to become acquainted with testing techniques and governmental policies. If they become involved in these surveys make sure their results will be used. Make sure they also understand the procedures to follow in collecting data and using it to improve the environment through government action. Lectures could be given by appropriate agency officials explaining their work and the techniques they use. Statewide YCC efforts could be coordinated to compare data and provide collective action. Presentations could be planned for local citizen's groups and service agencies to acquaint the public with the problems or the importance of a particular area. This not only acquaints the enrollees with community resources but also gives them public recognition for their work.

FIELD TRIPS

Field trips can be used to introduce, reinforce, and correlate projects the YCCer's will be working on. They should be timely, however, and fit into the sequence of the summer.

Examples -

Work Projects	Field Trip
Water Quality survey	Visit water and sewage treatment plant
Park Development	Visit other YCC parks of other parks to get ideas. Visit the Department of Parks and Recreation and its maintenance facilities.

Work Projects	Field Trip
River Cleanup	Visit water treatment plants. Visit upstream communities to see whether they treat water and how. Visit water quality control center.
Nature Trail Development	Visit nature center and other nature trails for ideas.

It might also be beneficial to take urban youth to a rural nature-environmental education center toward the end of their summer, *after they understand* the importance of ecological understandings in *their own environment*. They will experience a new environment and see how the ecological principles they have discussed apply to all environments.

CAMPING TRIPS

Environmental awareness can and should be extended to any planned recreational activities. An overnight or weekend camp-out or canoeing trip is an excellent opportunity to study other biotic communities. Comparisons of similarities and differences in resource management and ecological relationships can be made. Overnight trips also allow the enrollees to live with and get to know each other in conditions outside of their work relationship. There are many environmental educational centers where young people can be sent for a new learning/living experience. Investigate your own area for such facilities or plan a weekend trip. Involve the enrollees in the planning of this experience as much as possible and make it *their* trip.

EXAMPLES OF URBAN WORK/LEARNING PROJECTS

Urban Park Development

The typical approach to urban park development is for the public park agency to assume complete responsibility for the design, construction, and maintenance of local parks. Park use, however, would increase and vandalism decrease if the people who use the park help design and build it. They identify more with the park and become more interested in its maintenance if they are consulted about its development. The community survey suggested in this outline should be a part of the preliminary investigation for a park project. Let the enrollees decide what information they want from the community. As they conduct this survey they will attract public attention to the park and provide visibility for the Youth Conservation Corps. They will also find themselves the center of some very positive attention which will increase their self-esteem and enthusiasm for work.

The enrollees should also be given some perspective on the roles played by parks and open space areas in creating a quality environment. The benefits they provide can be discussed in conjunction with the ecological principles they illustrate as the project is completed. They provide recreation areas and visual stimulation, but they also provide the following benefits in less obvious ways.

1. Trees give off oxygen in their photosynthetic processes which increases the oxygen supply in cities.
2. Trees in parks muffle noise.
3. Parks enhance neighborhoods and stimulate property values.
4. Trees in parks filter pollutants out of the air.
5. Parks act as flood control areas by providing more open grounds for water to soak into and decreasing runoff.
6. Trees in parks decrease soil erosion by catching raindrops on leaves and holding soil in their root systems.
7. Parks provide shady areas in hot cities.
8. They provide psychological benefits.
9. They can be used to isolate dangerous environments.
10. They offer educational opportunities and contribute to wildlife preservation.

There are many other benefits which are sometimes unique to certain parks. Add the benefits provided by your particular park project to the above list and incorporate them into your educational awareness program. A YCC park development project could include the following work goals.

1. Planning the park facilities.
2. Grading and landscaping
3. Building park benches, play equipment, etc.
4. Conducting soil surveys
5. Planting trees and shrubbery.
6. Wildlife habitat development (selective plantings, nesting boxes, etc.)

7. Cleaning of any waterways in parks
8. Nature trail development
9. Picnic area development

With these work goals in mind, environmental awareness could include the following --

I. Preliminary Investigations

  A. Tour of potential park area

    1. What could be developed?
    2. Who should benefit from the park?
    3. What are the problems?
    4. What facilities should be provided?
    5. Who is in charge of the parks in your city?
    6. What suggestions does the park maintenance staff have?
    7. Who uses or will use the park?

  B. Community survey

    1. What do the neighborhood children and adults want in the park?
    2. How many people will be served by the park?
    3. Where are nearby parks located?
    4. Who is served by the other parks?

  C. Potential advisors--your Community Resource Directory is a good source book for this information

    1. Parks and Recreation Commissioner
    2. Landscape architect
    3. Soil Conservationist
    4. Park maintenance personnel and police who patrol parks
    5. City forester

II. Environmental Awareness Lessons

- A. Historical background of the park or potential park site
- B. Urban vegetation
  - 1. What trees grow nearby?
  - 2. What are the effects of pollutants on trees?
  - 3. What trees are resistant to city conditions?
  - 4. What survival problems exist for trees in urban settings?
    - a. Paving cuts the water and oxygen supplies
    - b. All decaying matter (leaves, dead trees, etc.) are removed which prohibits the normal nutrient recycling necessary for plant growth.
    - c. Road salt causes chemical damage to certain trees
    - d. Gaseous pollutants cause deterioration.
  - 5. Benefits of vegetation
    - a. Cuts city heat
    - b. Removes gaseous and particulate pollutants from the air
    - c. Deadens noises
    - d. Provided wildlife habitat
    - e. Aesthetically pleasing
  - 6. Oxygen-carbon dioxide cycle between plants and animals
  - 7. Wildlife interrelationships with plants
    - a. Which plants do the squirrels use for homes?
    - b. What plants should we plant to attract specific animals?
  - 8. Tree and plant identification
  - 9. Plant succession
    - a. How is it prevented in the city?
    - b. Where is it evident?

C. Wildlife investigation

   1. Life cycles of animals (include insects) in the park
   2. Effects of wildlife on vegetation
   3. Competition between animals and man
   4. Investigations of carrying capacity of park
   5. Pest control
   6. Wildlife protection
      a. Responsible agencies
      b. Methods of citizen action for wildlife preservation
   7. Identification of insects and other animals
   8. Relationships of wildlife to man
   9. Adaptations of wildlife to urban areas

D. Waterway investigations

   1. Freshwater life in park streams and ponds
   2. Nutrient recycling in waterways
   3. Succession in ponds
   4. Water management policies and agencies
   5. Erosion control on stream and pond banks
   6. Water quality testing

E. Problem solving in parks

   1. How do park personnel deal with vandalism?
   2. What problems are caused by intensive park use?
   3. How are intensive use problems solved?
   4. How can we develop a maintenance-free park?

F. The park as an ecosystem

   1. Interrelationships of plants and animals

  2. What problems are caused by intensive park use?

  3. How are intensive use problems solved?

  4. How can we develop a maintenance-free park?

F. The park as an ecosystem

  1. Interrelationships of plants and animals

  2. Mineral recycling in parks

  3. Identification and mapping of park food chains

  4. Plant competition in the park

  5. Identification of limiting factors to plant growth

  6. Discussions of species diversity and its relationship to stability for park vegetation considerations

  7. Discussions of different ecosystems and their similarities

    a. Forest

    b. Farm

    c. Marine

    d. Inland waters

G. Community gardens -- could develop a small area for community gardens in the park

  1. Principles of cultivation

  2. Methods of soil preparation and planting

  3. Methods of soil erosion control on cultivated lands

  4. Pesticide use and misuse

  5. Compatibility among plants

H. Methods of erosion and drainage control

I. Landscaping techniques

RIVER CLEANUP

Local streams and rivers can often be developed as greenbelts and recreation areas in cities. City waters, in particular, suffer from pollution and are often clogged with debris. A YCC river clean-up project could include the following goals:

1. Clear debris from banks and streambed
2. Grade and plant banks for erosion control
3. Conduct water quality survey
4. Identify river pollutants and their sources
5. Develop walkways, bike paths, nature trails along banks
6. Develop picnic areas or mini-parks
7. Conduct community surveys
8. Assist government agencies in environmental advocacy work to prosecute pollutors

With these goals in mind, environmental awareness could include the following.

I. Preliminary Investigation

A. Tour of worksite

1. Purpose of project
2. What could be developed?
3. What is best procedure?
4. What facilities should be provided?
5. What benefits will be provided for the community?
6. What problems might occur?

B. Potential advisors

1. Water conservationist
2. Limnologist
3. Fresh water biologist
4. Environmental Protection Agency
5. Parks and Recreation Commissioner

6. Landscape architect

7. Water pollution analyst

8. City planner

II. Environmental Awareness Lessons

A. Historical background of stream

B. Fresh water ecology

1. Insect studies

2. Relationship of oxygen content and temperature

3. Eutrophication processes

4. Factors that affect stream life

5. Nutrient recycling in ponds

C. Limnology

1. Study of the physical factors that affect stream life

2. Studies of plant and animal life

D. Water resource management

E. Water pollution standards

F. Effects of specific pollutants on stream plants and animals

G. Methods used for identification of polluting industries and other facilities

H. Identification of advocacy groups interested in water pollution

I. Field trips

1. Sewage treatment plants

2. Water treatment plants

3. City reservoir

J. Identification of city water source

1. Cleaning processes used for city water

2. Logistics of city water systems

K. Methods of picnic area development

L. Soil testing to determine suitable vegetation for banks

M. Methods of bike path development

N. Methods of erosion control

O. Methods of bank stabilization

    1. Gabions

    2. Cradles

The two preceeding work project outlines cover only two of the many relevant to urban areas. They should be used as examples and enhanced by the creative ideas of individual YCC supervisors. If a list of learning goals is made for each of the work projects chosen, your program will run more smoothly and fulfill the educational objectives of the Youth Conservation Corps.

If possible, YCCers should gain understandings about life in their city. For example, what are the major industries? How do they contribute to, or alleviate pollution problems? How is city planning accomplished? What would an environmental quality inventory reveal? It can be very revealing if used in conjunction with a work project. It could also provide insights into how a city moves and where problems exist.

YCCers should also gain knowledge about how their city functions. The urban environment includes the social services and social and business interrelationships which allow it to function in an artificial environment. For example, what city agency ahould be contacted about rodent problems? Which one has jurisdiction over city sewers or water quality? Which one would help an apartment dweller get compensation for sub-standard conditions? Many city agencies are involved in and responsible for urban environmental quality. Make sure that your enrollees become familiar with the specific one responsible for their work project areas. If they can understand the processes that allow a city to function and the services available to its residents, they will be more active as involved citizens in achieving environmental quality.

CHAPTER 7 - ROLES OF SELECTED FEDERAL AND STATE AGENCIES

FEDERAL AGENCIES

Department of Agriculture (USDA - 1862)

Forest Service (FS)

Created in 1905, the Forest Service has the Federal responsibility for national leadership in forestry. The Forest Service manages 115 National Forests and 19 National Grasslands comprising 187 million acres including 10.7 million acres of wilderness in 41 States and Puerto Rico, under the principles of multiple use and sustained yield. National wood and paper needs are balanced with other renewable resources and the benefits of recreation, natural beauty, wildlife habitats, livestock forage and water supply.

Soil Conservation Service (SCS)

Created in 1935, the Soil Conservation Service has responsibility for developing and carrying out a national soil and water conservation program in cooperation with private land owners and operators and other land users and developers, with community planning agencies, resource groups and other agencies - Federal, State and local.

The soil and water conservation program is carried on in all States plus Puerto Rico and the Virgin Islands through technical help provided to over 3,000 locally organized and operated conservation districts covering 2 billion acres.

Department of the Interior (USDI - 1849)

U. S. Fish and Wildlife Service

Organized in 1956, the U. S. Fish and Wildlife Service is responsible for the perpetuation, use, understanding and enjoyment of fish and wildlife resources of the Nation.

The Service manages 30 million acres of land in 329 refuges and nearly 100 fish hatcheries. Their Federal facilities provide a nationwide system of refuges for migratory wildlife and endangered species; management areas for the scientific study of fish and wildlife populations, fish restocking, and research stations. Their programs are operated in close cooperation with State and private organizations.

National Park Service (NPS)

The National Park Service was established in 1916, and presently administers over 280 areas of natural, historic, recreational or cultural significance for the use and enjoyment of the American people.

The Service protects and preserves the natural environment of this extensive system of National Parks, National Monuments, historic sites, battlefields, National Recreation areas, rivers, lakes and seashores.

Bureau of Indian Affairs (BIA)

Created in 1824, the Bureau of Indian Affairs actively encourages and trains Indians and Alaskan Native people to manage their own affairs under the trust relationship to the Federal Government. The Bureau utilizes the skills and capabilities of the Indian and Alaskan Native people to facilitate the full development of their human and natural resource potentials.

Bureau of Land Management (BLM)

Established in 1946, with the consolidation of the General Land Office (1812) and the Grazing Service (1934), the Bureau of Land Management classifies, manages and disposes of Federal public lands, not included within the National Park, Forest or Refuge systems, and their related resources according to the principles of multiple use management.

The Bureau administers the mineral resources connected with acquired lands and the submerged lands of the Outer Continental Shelf.

Bureau of Reclamation (WBR)

Established as the Reclamation Service in 1902, the Bureau of Reclamation conducts programs designed to stabilize and to promote the growth of local and Regional economies through optimum development of water and related land resources in the 17 contiguous Western States.

Reclamation projects include the concurrent purposes of irrigation, municipal and industrial water supply; hydroelectric power generation and transmission; flood and river regulations and contro; recreational and other public uses. Project beneficiaries, through the Bureau, make repayment of reimbursable costs to the Government for construction and operation.

Bureau of Outdoor Recreation

Created in 1963, the Bureau of Outdoor Recreation is responsible for promoting coordination and development of effective programs related to outdoor recreation.

Under the Land and Water Conservation Act of 1965, the Bureau administers a program of financial assistance grants to States for comprehensive planning, land acquisition and facility development. The fund also finances acquisition of Federal land and water areas for recreational purposes.

Geological Survey (USGS)

The Geological Survey was established in 1879, as the National Agency to perform surveys, investigations and research covering topography, geology, mineral and water resources of the United States.

The Survey also classifies land as to mineral characteristics, water and power resources, enforces Federal regulations regarding oil, gas and other mining leases, permits, licenses, development contracts, and gas storage contracts; and publishes information regarding these areas.

U. S. Department of Defense (DOD)

U. S. Army Corps of Engineers (COE)

Created in 1824, the Army Corps of Engineers provides development of water resources including construction of major dams, reservoirs, levees, harbors, waterways, locks and flood and navigation control structures.

Environmental Protection Agency (EPA)

Established in 1970, the Environmental Protection Agency provides a coordinated governmental action to assume the systematic abatement and control of pollution through a variety of research, monitoring, standard setting and enforcement activities.

The EPA conducts programs with Federal, State, local and private organizations dealing with air and water; pesticides, solid waste and radiation. The EPA enforces Federal regulations regarding environmental quality standards and reviews Federal agency programs regarding their impact on environmental quality through the review of environmental impact statements.

STATE AGENCIES

The land management agencies within each State also have a large role in the YCC program. They function similarly to the Federal agencies. Some of these include:

Departments of Natural Resources
Departments of Education
Departments of Manpower Services
Departments of Human Resources
State Parks and Recreation

State Forestry
State Fish and Wildlife
Commissions on Youth
Commissions on Environmental Protection

SOURCE LIST

The following is a partial list of organizations where resource materials can be obtained at minimal or no cost.

Organization	Types of Information Available
American Forestry Association 919 Seventeenth Street Washington, D.C. 20006	Membership & subscription to the monthly "American Forests" magazine $8.50
Common Cause 2100 Main Street, N.W. Washington, D.C. 20037	Membership dues - $15.00 Political influence for making the government responsive to people
Conservation Education Association University of Wisconsin, Green Bay Green Bay, WI 54301	Excellent bibliography - $2.50 Supplement - $1.00
Ducks Unlimited, Inc. National Headquarters P.O. Box 66300 Chicago, IL 60666	Dues - $10-$20 Organization of sportsmen to control and improve wetland breeding areas for ducks on public and private lands
ENVIRONMENT Magazine 438 North Skinker St. Louis, MO 63130	Monthly publication dealing with effects of technology on the environment, published by the Committee for Environmental Information. General subscription - $12.50 Government or library - $17.50
Environmental Action Room 731 1346 Connecticut Avenue, N.W. Washington, D.C. 20036	Subscription to biweekly newsletter - $15.00. Deals with all types of problems of the environment thru legislative and community action - covers such topics as transportation, water pollution, corporate responsibility, and environmental legislation
Environmental Defense Fund 162 Old Town Road East Setauket, N.Y. 11733	A group of citizens, scientists, and lawyers, dedicated to the protection of environmental quality thru legal action. Newsletter and membership: Student - $10.00, basic - $15.00

Organization	Types of Information Available
Friends of the Earth 30 East 42nd Street New York, N.Y. 10017	Concentrating efforts on fighting supersonic transport development, and other environmentally damaging technology. Student - $10.00 Basic - $20.00
Glass Containers Manufacturing Institute 330 Madison Avenue New York, N.Y. 10017	Pamphlets on glass, recycling, etc.
International Oceanographic Foundation 10 Rickenbacker Causeway Virginia Key Miami, FL 33149	Membership - $15.00. Includes subscription to "Sea Frontiers" and "Sea Secrets"
League of Women Voters 1730 M. Street Washington, D.C. 20036	"Planning a Community" a useful checklist of the basic elements of successful local planning efforts
National Audobon Society 1130 Fifth Avenue New York, N.Y. 10028	Membership - $15.00, Family - $18.00 Magazine subscription - $13.00 Good wildlife conservation coverage
National Education Association 1201 Sixteenth Street, N.W. Washington, D.C. 20036	"Man and His Environment" -$1.75
National Parks and Conservation Association 1701 Eighteenth Street Washington, D.C. 20009	National Parks and Conservation magazine "The Environment Journal", with $12.00 associate membership
Nature Conservancy 1522 K. Street, N.W. Washington, D.C. 20005	Subscribing membership - $10.00 Family - $15.00, Student - $5.00 Buys land and holds it in trust until it can be purchased by the government
National Wildlife Federation 1412 Sixteenth Street, N.W. Washington, D.C. 20036	Associate membership - $7.50 includes "National Wildlife" magazine. A $7.00 youth membership includes "Ranger Rick's Nature Magazine"
Population Reference Bureau 1755 Massachusetts Avenue, N.W. Washington, D.C. 20036	Good bibliography, source list, and film guide on population. Membership: Student or teacher - $5.00. Basic -$8.00

Organization	Types of Information Available
Sierra Club 1050 Mills Tower San Francisco, CA 94104	List of publications, pollution and population information, protection of scenic areas.Membership: Student - $10.00 Basic - $17.00
Wilderness Society 729 Fifteenth Street, N.W. Washington, D.C. 20005	Reports, pamphlets, and reprints on preservation and use of wilderness. Membership includes "Living Wilderness Magazine" and "Wilderness Reports" Student - $5.00, Basic - $10.00

GOVERNMENT AND OTHER INFORMATION OFFICES - Contact the National Office for the location of the State or local office nearest you.

Bureau of Indian Affairs
U.S Department of the Interior
Washington, D.C. 20240

Bureau of Reclamation
U.S. Department of the Interior
Washington, D.C. 20240

Bureau of Land Management
U.S Department of the Interior
Washington, D.C. 20240

Bureau of Outdoor Recreation
U.S. Department of the Interior
Washington, D.C. 20240

U.S.D.A. -Forest Service
P.O. Box 2417
Washington, D.C. 20013

Information Office
U.S. Department of Agriculture
Fourteenth Street & Independence
Avenue, S.W.
Washington, D.C. 20250

Information Center
U.S. Department of Health, Education,
and Welfare
330 Independence Avenue, S.W.
Washington, D.C. 20202

Commissioner
Federal Water Pollution Control
Administration
633 Indiana Avenue, N.W.
Washington, D.C. 20242

Air Pollution Control Administration
801 North Randolph Street
Arlington, VA 22200

Council for Urban Affairs
Executive Secretary
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

U.S. Fish and Wildlife Service
U.S. Department of the Interior
Washington, D.C. 20240

U.S. Department of Commerce
Springfield, VA 22151

Soil Conservation Society of America
7515 Northeast Ankeny Road
Ankeny, Iowa 50021

Lists of publications, by subject area, may be obtained from:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

SELECTED BIBLIOGRAPHY FOR YCC ENVIRONMENTAL LIBRARY

Suggest obtaining these books from the local library for summer use.

ACE BOOKS

New World, No World; Herbert, F.

APOLLO BOOKS

Voice of the Desert; A Naturalist's Interpretation;
Krutch, J.W.

BANTAM BOOKS

Earth Day, The Beginning

BALLANTINE BOOKS

The Population Bomb; Ehrlich, Paul
The Environmental Handbook; Debell, Garrett
The Frail Ocean; Marx, Wesley
Perils of the Peaceful Atom; Curtis and Hogan
Defoliation, Whiteside, Thomas
Life and Death of the Salt Marsh; Teal, John and Mildred
The User's Guide to the Protection of the Environment;
Swatek, Paul
The Alien Animals; The Story of Imported Wildlife;
Laycock, George
Science and Survival; Commoner, Barry
*A Sand County Almanac; Leopold, Aldo
SST and Sonic Boom Handbook; Shurcliff, William
The Diligent Destroyers; Laycock, George
Nuclear Dilemma; Bryerton, Gene
Voter's Guide to Environmental Politics; Debell, Garrett
How to Be A Survivor; Ehrlich and Harriman
Basic Book of Organic Gardening; Rodale, Robert
Voices for the Wilderness; Schwartz, William
The Sierra Club Wilderness Handbook; Brower, David

DOUBLEDAY BOOKS

The Unclean Sky; Batton, L.J. (Anchor)
The Metropolitan Enigma; Wilson, James Ed. (Anchor

FREEMAN AND COMPANY BOOKS

Population, Evolution and Birth Control;
Hardin, Garrett

GOLDEN FIELD GUIDES

**Birds of North America
**Trees of North America
Sea Shells of North America

GOLDEN NATURE GUIDES

Birds
Flowers
**Insects
Trees
**Reptiles and Amphibians
Stars
**Mammals
Seashores
**Fishes
Fossils
**Gamebirds
Zoology
**Weather
Sea Shells of the World
**Rocks and Minerals
**Butterflies and Moths
Non-Flowering Plants
**Insect Pests
**Pond Life
Zoo Animals
**Spiders

HOLT, RINEHART BOOKS

*Ecology; Odum, Eugene

HOUGHTON-MIFFLIN COMPANY BOOKS

*Not So Rich As You Think; Steward, George
Since Silent Spring; Braham, Frank
Silent Spring; Carson, Rachel
The Great Chain of Life, Krutch, J. W. (Petersen Field Guide Series)
Field Guide to Birds; Petersen
Field Guide to Reptiles and Amphibians; Conant
Field Guide to Insects of North America and Mexico; Boorer
Field Guide to Mammals; Burt, W. H.
Field Guide to Butterflies; Klots, Alex
Field Guide to Trees and Shrubs; Petrides, George
Field Guide to Stars and Planets; Menzel
Field Guide to Rocks and Minerals; Plough

LITTLE, BROWN AND COMPANY BOOKS

Wilderness Bill of Rights; Douglas, W. O.
Our Plundered Planet; Osborn, Fairfield

McGRAW-HILL COMPANY

Urban Ecology; George and McKinley

NEW AMERICAN LIBRARY BOOKS

*The Web of Life; Storer (NAL)

PRENTICE-HALL, INC. BOOKS

Concepts of Ecology; Kormondy, Ed.

RANDOM HOUSE, INC. BOOKS

*The Forest and Sea - A Look at the Economy of Nature and the Ecology of Man; Bates, M.

SIMON & SCHUSTER, INC. BOOKS

Ecotactics; Mitchell, John (PB)

YALE UNIVERSITY PRESS

The Environmental Crisis; Helfrich, H., Jr.

ALSACE BOOKS AND FILMS

The Natural History Guide; Laun, H. Charles

NEW GAMES FOUNDATION
P.O. Box 7901, San Francisco, CA 94120

The New Games Book
New Games Training Manual

OF SPECIAL INTEREST FOR URBAN AWARENESS

City Planning

Central Washington State College, Man's Environment; How It May Be Improved. Ellensburg, WA, 1971

Environmental Education Center, City Planning. Oteen, NC.

Group for Environmental Education, Philadelphia, 1971.
Introductory Unit to the Urban Environment
Our Man-made Environment: A Collection of Experiences, Resources, and Suggested Activities

Environmental Advocacy

Landau, Norman, The Environmental Law Handbook. (Legal remedies in existence now to stop government and industry from destroying our environment.)

Sax, Joseph L., Defending the Environment: A Strategy for Citizen Action

Union Township Public Schools, Priority One - Environment/A Pollution Program. Pollution Control Education Center, Union, NJ

Urban Ecology

American Society of Planning Officials, Trees in the City. Planning Advisory Service Report #236, 1968.

Bellevue Public Schools, Project USE Program. Bellevue, WA, 1974. (Urban-Suburban environmental education)

Denver Public Schools, Denver Urban Environmental Studies, Denver, CO, 1971.

McCue, George, Ecology: The City. Benziger, Bruce, & Glencoe, Inc. New York, 1971.

Rublowsky, John, Nature in the City.

Schmid, James A., Urban Vegetation. Jack McCormick & Assoc.

Stearns, F. W., Wildlife Habitat in Urban and Suburban Ecosystems

U. S. Department of the Interior, Environmental Education on an Urban School Site, Washington, D.C. 1972.

Work Projects

California Roadside Council, More Attractive Communities for California. (Practical handbook for community action for a better everyday environment, especially helpful on landscaping techniques.) 2636 Ocean Ave., San Francisco, CA 94132.

Massachusetts Dept. of Natural Resources, Manual for Municipal Conservation Commissions. (Includes practical suggestions for specific projects) 100 Cambridge St., Boston, MA)

National Audubon Society, Wildlife Habitat Improvement. (Clear, well-illustrated citizen's guide to the management and increasing of wildlife in urban and rural areas.)

Parks Council, A Little About Lots. (Good manual on how to make vest pockets parks of vacant lots, how to run them, and how to organize tree planting and neighborhood clean ups.)
80 Central Park West, New York, NY, 10023. 1969

Strong, Ann Louise, Open Space for Urban America. (Good and very complete guide to all the techniques available for conserving open space; extensive appendices include model statutes and legal forms.) Office of Metropolitan Development, Department of HUD, Washington, D. C. 20410

Urban Research Corporation, Youth Takes the Lead. (Lessons of the many community programs sparked by the National Youth Conference on Natural Beauty and Conservation.) 5464 South Shore Dr., Chicago, IL 60605.

* Suggested priority for background information

** Suggested priority for field information

GLOSSARY

abiotic - the nonliving components of the environment.

acre - a measurement of land surface containing 43,560 sq. ft. (4,047 sq. meters). This is equal in area to a square approximately 209 feet (64 meters) on a side. Most crops are grown and most farms are managed in terms of acres of land (1 acre = .4047 hectare)

adapt - to alter or adjust to fit new conditions and uses. Animals often adapt themselves to changes in weather and climate.

aerobic decomposition - the decomposition of organic material by microorganisms that require oxygen. The major products of decomposition are carbon dioxide and water.

aesthetic - pleasant or beautiful in color, texture, or general appearance.

air pollution - the accelerated transfer of natural and synthetic substances into the atmospheric reservoir, usually as a consequence of man's activities.

algae - primitive organisms; many are microscopic.

anaerobic decomposition - the decomposition of organic material by bacteria in the absence of oxygen. The major product of decomposition is methane.

annual - a plant which completes its life cycle, from seedling to mature plant, in a single growing season and then dies.

aquifer - a layer of rock or soil that is permeable.

aspect - relating slope of hillside to compass direction, e.g., north facing slope would have north aspect.

biodegradable - capable of being broken down by natural means into basic reusable components. Synonym for "soft" as in soft detergent.

biological control - the use of a pest's own predators and parasites to control its population.

biological half-time - the period required for half of an ingested material to be excreted from the body.

biological magnification - increased concentration of chemical substance, such as DDT, stored in organisms as you move through a food chain.

biological oxygen demand (BOD) - the amount of oxygen required to decompose the organic material in a given volume of water.

biomass - the total quantity of living organisms of all the species in a community at a given time.

biosphere - the portion of the earth and its atmosphere capable of supporting life.

biotic - refers to the living components of the environment.

biotic potential - the inherent maximum population growth rate that occurs under optimum conditions.

blue-green algae - a type of tiny green plant that often causes surface waters to appear like pea soup.

breeder reactor - a type of nuclear reactor that produces slightly more fissionable material than it consumes.

broad spectrum pesticide - a chemical that kills more than the target species.

calorie - a unit of energy. The amount of heat required at a pressure of one atmosphere to raise the temperature of one gram of water one degree centigrade.

carnivore - an animal that uses other animals as a food source.

carrying capacity - the maximum population that a given ecosystem can support indefinitely.

chlorinated hydrocarbons - chemical family of insecticides, including DDT, that are broad-spectrum pesticides and long-lasting.

clear cutting - the felling of all trees in an area in one operation.

climax community - a relatively stable community that is able to maintain itself over long periods of time and to regenerate and replace itself without marked further change.

coliform bacteria - bacteria normally found in the human intestine whose presence in water in sufficient numbers is used to indicate the possibility of contamination by inadequately treated sewage.

combined sewer - sewer system where both storm water and sanitary wastes are carried by one large pipe to a treatment plant.

community - all the plants and animals in a particular habitat that are bound together by food chains and other interactions that are self-perpetuating.

compaction of soil - compressing soils by means of pressure, e.g. from cows' hooves or hikers' feet, so that the available space within the soil for air and water is reduced.

competition - an interaction between members of the same population or two populations resulting from a greater demand than supply for a mutually required resource.

compost - a fertilizer composed of the organic fraction of refuse.

condensation - changing water from the vapor to the liquid form; an important part of the hydrologic cycle.

conservation - the intelligent use of natural resources to assure their continuing availability.

consumer - an organism which ingests other organisms or organic matter.

contact herbicide - an agent that destroys or inhibits plant growth at the point of contact.

contour farming - plowing in such a way that the furrows connect points of equal elevations in order to minimize erosion and runoff.

cultural eutrophication - the result of activities of man that increase the amount of plant nutrients entering surface waters, hence increasing algae and other aquatic plant populations. See eutrophication for its definition.

decibel - a unit measure of sound energy intensity.

deciduous - a plant, including the trees, which sheds all of its leaves every year at a certain season.

decomposer - microconsumers; e.g., bacteria and fungi

demography - the statistical study of (human) populations.

density - number of organisms per unit of space.

density-dependent factors - factors whose effect on the population varies with the density of the population (greater population, greater effect).

dichotomous - dividing into two parts.

dichotomous key - a method used to identify objects by providing a choice of two identifying factors in a branching series where the factors become increasingly definitive until the object is identified.

dissolved oxygen - oxygen contained in a solution; usually water.

diversity index - the number of species divided by the number of individuals of all these species in an area.

dominance - in ecology refers to superior strength and/or vigor of certain plants and animals.

ecology - the study of the interrelationships of organisms to one another and to the environment.

ecosystem - the community including all the component organisms together with the abiotic environment forming an interacting system.

energy - the ability to perform work.

environment - all the external conditions surrounding a living thing.

environmental inventory - a list, or survey of resources; i.e., all the plants, animals and/or manmade structures in the camp.

environmental resistance - the sum total of all factors in the environment that limit population growth.

epilimnion - the warm, less dense top layer of water in a stratified lake.

erosion - the removal and movement of particles of the land surface by wind, water, ice or earth movements such as landslides and creep.

eutrophication - a natural process whereby lakes gradually become more productive; if the process is man-accelerated, the term "cultural eutrophication" is used.

evaporation - molecular matter going from a liquid to a gaseous state.

exploitation - the use by an organism of an environmental resource.

First Law of Thermodynamics - a law stating that although energy can be transformed from one form to another, it cannot be created or destroyed; also expressed as the conservation of energy.

food chain - a sequence of organisms, including producers, herbivores, and carnivores, through which energy and materials move within an ecosystem.

food chain accumulation - the increase in concentration of certain chemicals in food chains.

food web - a complex of interlocking food chains.

fossil fuels - the remains of once-living plants and animals that are burned to release energy. Examples are coal, oil, and natural gas.

gene pool - the sum total of inherited characteristics possessed by a species.

geothermal energy - heat energy conducted from the earth's interior.

greenhouse effect - the absorption and re-radiation of terrestrial longwave energy by atmospheric water vapor, carbon dioxide, and ozone.

ground water - water that is contained in subsurface rock and soil layers.

habitat - the place where an organism lives.

half-life - the amount of time required for one-half of the radioactive nucleus of an isotope to decay.

herbicide - an agent used to destroy or inhibit plant growth.

herbivore - an animal that uses plants as a food source.

humus - the dark, rich part of the earth formed by the decay of roots, stems, and leaves of plants, as well as the decay of animal litter.

hydroelectric power - electric power produced by falling water, usually by means of a waterwheel or turbine.

hydrologic cycle - the path water takes from precipitation until it evaporates and recondenses in cloud form, back to precipitation.

hypolimnion - the colder, denser bottom layer of water in a stratified lake.

irradicant - fungicide which destroys the disease-causing organism.

kinetic energy - energy an object possesses because of its motion.

LD_{50} - the amount of toxin required to kill 50% of a population of test animals, expressed in p.p.m. or mg./kg. of body weight.

lichen - algal and fungal plants growing together in a sybiotic relationship as an organized whole.

limiting factor - any component of the environment that limits the well-being of an organism.

lipid - an animal fat.

locus of action - the area of metabolic reaction.

migration - to pass periodically from one region or climate to another; a common pattern among waterfowl and some mammals.

mode of action - a metabolic pathway by which a substance affects the organism.

monoculture - an agricultural endeavor that lacks diversity. Usually refers to farming one or two kinds of crops exclusively.

mulching - spreading of leaves, straw, or other loose material on the ground around plants to prevent evaporation of water from the soil, freezing of roots, etc.

multiple use - a resource management objective based upon maximizing the total goods and services derived as in contrast to managing for a specific resource such as wildlife or timber.

niche - the role of an organism in the environment, its activities and relationship to the biotic and abiotic environment.

nitrogen cycle - the pathway of nitrogen from atmosphere to soil to plant to animal and back to atmosphere.

non-renewable resource - a resource of finite supply which cannot be replaced.

nuclear fission - the fragmenting of a nucleus resulting in the release of neutrons and the formation of two new nuclei.

nuclear fusion - an extremely high-temperature process whereby two or more nuclei are fused into one.

nuclear power - power, usually transmitted in the form of electricity, derived from nuclear fission or fusion.

ligotrophic lake - a lake with low biological productivity; usually has clear water and aesthetic appeal.

omnivore - an animal that can use both plants and other animals as food sources.

optimum - the most favorable condition as to temperature, light, moisture, food and other things necessary for growth and reproduction.

organic - referring to matter whose basic molecular structure is made up of carbon and hydrogen.

oxygen sag curve - a characteristic pattern showing the decrease in dissolved oxygen resulting from the input of organic material into a river.

parasitism - a population interaction in which one organism (the parasite) obtains needed energy and nutrients by living within or upon another organism (the host).

pH - a measure of the acidity or alkalinity of a solution.

phenoxy compound - a group of herbicides derived from phenoxy acids, usually acetic, proprionic, or butyric.

pheromone - a chemical excretion of animals used for communication.

photosynthesis - the process by which light energy is converted by green plants to chemical energy (food energy).

pioneer species or community - tree species which initially invade unforested areas.

pollution - a change from the normal transfer rate of materials or energy between any two reservoirs.

population - groups of individuals of any one kind of organism.

potential energy - stored energy that may be converted to kinetic energy.

precipitation - water which reaches the ground from the atmosphere as a result of condensation; includes rain, sleet, snow, etc.

predation - a population interaction in which one organism (predator) kills and eats another organism (prey).

pre-emergent herbicide - applied before weeds and/or crop emerges from soil.

prescribed or controlled burning - the use of fire as a resource management tool, e.g. to create improved game habitat.

preservation - one important component of conservation; usually has the connotation of setting aside, non-use, or non-consumptive use.

primary air pollutants - substances introduced into the atmosphere that, unaltered, may pose a serious hazard to environmental quality.

primary consumer - a species which derives its food directly from producer species.

primary sewage treatment - physical processes used in removing suspended materials from waste water.

producer - organism capable of carrying out photosynthesis.

recharger - related to water cycle

recycling - see decomposer.

regeneration - used by foresters to mean reestablishment of a stand similar to the original one on a given site.

renewable resource - a resource in which the materials as well as organisms are "reassembled" as fast as they are dispersed.

resources - biologically, everything of natural origin, living and non-living, which humans and other organisms use.

rotation - the period of time between two commercial harvests; i.e. the cutting cycle in a forest.

run-off - precipitation that moves from its point of contact with the ground to another on the surface usually as a result of the soil's inability to absorb it.

sanitary landfill - a dump in which the refuse is covered with soil periodically in order to reduce activity of rodents and insects while speeding the decomposition process.

sanitary sewer - the system of pipes that transports domestic wastes to a sewage treatment plant.

scrubbing - the removal by water spray of water-soluble pollutants from an air stream.

Second Law of Thermodynamics - a law stating that all energy transformations are less than 100 percent efficient.

secondary air pollutants - products of reactions among primary air pollutants.

secondary consumer - a carnivore which feeds upon a primary consumer (herbivore).

secondary treatment - a biological process used mainly to remove dissolved organic materials from water.

separated sewer system - a sewer system in which two pipes are used; one transports surface runoff and the other transports sanitary wastes.

solid waste - waste which, when discarded, is in a solid form as contrasted to gaseous waste and liquid waste.

Spaceship Earth - phrase used to emphasize that the earth is essentially a closed ecosystem with limited and interrelated resources. Idea: "We've only got one earth; let's make it last."

specialization - refers to an organism, or part thereof, that is adapted to a particular kind of life or to a certain combination of environmental conditions.

storm sewage - runoff from roofs, parking lots and lawns.

succession - the gradual replacement of one community by another.

sustained yield management - the use of a renewable resource at a rate that permits regeneration for use, continuing undiminished into the future.

symbiosis - the living together of two or more organisms of different species (includes parasitism, mutualism and commensulism).

synergism - an interaction of two factors in which the total effect is greater than the sum of the effects of the two factors evaluated independently.

systemic herbicide-an agent that destroys or inhibits plant growth by being drawn into the plant's system.

teratogenic - causing malformation of the fetus.

tertiary treatment - an advanced waste-water treatment process used to remove more efficiently chemicals such as phosphates and nitrates.

thermal power - power, usually distributed in the form of electricity, which is derived by the combustion of fuels--usually fossil fuels such as coal, natural gas and petroleum.

thermocline - the transition zone in a stratified lake where a rapid temperature decrease occurs with increasing depth.

thermopollution - heat energy where it is not wanted, e.g., where it raises the temperature of a natural body of water to the extent that it is detrimental to the balance of the ecosystem.

tilth - the general physical condition of soil, which determines how it holds together, absorbs, retains moisture and air, and lends itself to cultivation. Conservation practices, especially of grasses and legumes, tend to improve the tilth, thereby producing a more favorable environment for plant growth.

trade-offs - compromises, usually due to conflicting goals and/or inadequate resources. For example, pesticides may increase crop production, but disrupt other functions within the ecosystem.

transpiration - water voided as a gas from specialized leaf cells of plants. One important component of the hydrologic cycle.

turbidity - a decrease in visability resulting from the scattering of light by suspended particles in water.

water table - the surface forming the upper boundary of the groundwater reservoir.

watershed - all the area draining into a stream.

weathering - the chemical decomposition and mechanical disintegration of rock.

wilderness - generally uncultivated and undeveloped land. Usually the connotation is that the land is in the pristine condition.

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☆ U.S. GOVERNMENT PRINTING OFFICE: 1977—773-635/K9867